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(57) Abstract

The present invention relates to cosmetic compositions comprising (A) at least one amide derivative having a specified formula; and (B) at least one ingredient selected from the group consisting of (B-1) polyhydric alcohols, (B-2) vegetable extracts and (B-3) organic acids or salts thereof. The compositions can enhance the water-retaining ability of the horny layer and have excellent effects for improving skin roughness and preventing the formation of wrinkles.

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SKIN AND HAIR COSMETIC COMPOSITIONS

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to cosmetic compositions which can enhance the water-retaining ability of the horny layer and have excellent effects in improving skin roughness and preventing the formation of wrinkles.

Discussion of the Background:

The water content of the horny layer has heretofore been known to be critical for imparting moisture to the skin to maintain skin smoothness and softness. The retention of water in the horny layer is said to rely upon a water-soluble component contained in the horny layer, namely, a free amino acid, organic acid, urea or inorganic ion.

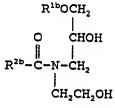
In the above circumstances, these materials have been incorporated either singly or in combination in cosmetics and the like with a view toward improving or preventing skin roughness.

Besides, many humectants having a high affinity for water have also been developed and have been used for improving the skin roughness.

However, these humectants remain on the skin surface when they are applied to the skin, so that they serve to supply water to the horny layer. Moreover, their effects are temporary and they are not such that can fundamentally improve

the water-retaining ability of the horny layer itself and can prevent or cure skin roughness substantially.

Therefore, the present applicant previously proposed, as an external skin care composition having the effect of fundamentally improving the water-retaining ability of the horny layer, an external skin care composition [Japanese Patent Publication No. 42934/1989 (Japanese Patent Application Laid-Open No. 228048/1987)] comprising an amide derivative represented by the following formula (a):



(a)

wherein R^{1b} is a linear or branched and saturated or unsaturated hydrocarbon group having 10-26 carbon atoms, and R^{2b} is a linear or branched and saturated or unsaturated hydrocarbon group having 9-25 carbon atoms.

Further, the present applicant proposed external skin care compositions having the same effects as described above in Japanese Patent Application Laid-Open Nos. 216812/1988, 218609/1988, 222107/1988, 227513/1988, 29347/1989, and 31752/1989, etc.

However, the amide derivatives used in these external skin care compositions bring about the excellent effects as described above, but have such properties as high melting point, high crystallinity and low solubility in a base, and so they still involve problems to be solved from the viewpoint of penetration into the skin, and the like when incorporated into

cosmetics. There has thus remained a demand for development of a cosmetic composition having excellent effects in improving skin roughness.

SUMMARY OF THE INVENTION

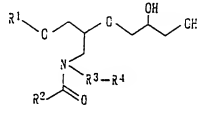
It is therefore an object of the present invention to provide novel cosmetic compositions which have the effect of fundamentally improving (maintaining or enhancing) the water-retaining ability of the horny layer.

It is another object of the present invention to provide novel cosmetic compositions which can prevent and cure skin roughness or inflammation, and moreover can prevent dermal aging such as the formation of wrinkles to enhance the protective and maintenance performance of the skin.

These and other objects, which will become apparent from the following detailed description, have been achieved by the inventors' discovery that cosmetic compositions comprising at least one compound selected from novel amide derivatives represented by the general formulae (1) to (4), which will be described subsequently, and at least one ingredient selected from polyhydric alcohols, vegetable extracts and organic acids or salts thereof can achieve the above object, thus leading to completion of the present invention.

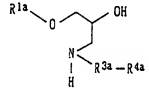
According to the present invention, there is thus provided a cosmetic composition comprising the following components (A) and (B):

(A) at least one compound selected from the amide derivatives represented by the following general formulae (1), (2), (3) and (4):



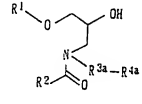
(1)

wherein R^1 and R^2 are identical to or different from each other and are, independently, a hydrocarbon group having 1 to 40 carbon atoms, which may be hydroxylated, R^3 is a linear or branched alkylene group having 1 to 6 carbon atoms, or a single bond, and R^4 is a hydrogen atom, a linear or branched alkoxyl group having 1 to 12 carbon atoms, or a 2,3-dihydroxypropyloxy group, with the proviso that when R^3 is a single bond, R^4 is a hydrogen atom;



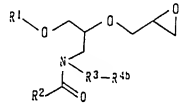
(2)

wherein R^{1a} is a hydrocarbon group having 4 to 40 carbon atoms, which may be hydroxylated, R^{3a} is a linear or branched alkylene group having 3 to 6 carbon atoms, and R^{4a} is a linear or branched alkoxyl group having 1 to 12 carbon atoms;



(3)

wherein R^1 and R^2 are identical to or different from each other and are, independently, a hydrocarbon group having 1 to 40 carbon atoms, which may be hydroxylated, R^{3a} is a linear or branched alkylene group having 3 to 6 carbon atoms, and R^{4a} is a linear or branched alkoxyl group having 1 to 12 carbon atoms;



(4)

wherein R^1 and R^2 are identical to or different from each other and are, independently, a hydrocarbon group having 1 to 40 carbon atoms, which may be hydroxylated, R^3 is a linear or branched alkylene group having 1 to 6 carbon atoms, or a single bond, and R^{4b} is a hydrogen atom, a linear or branched alkoxyl group having 1 to 12 carbon atoms, or a 2,3-epoxypropyloxy group, with the proviso that when R^3 is a single bond, R^{4b} is a hydrogen atom; and

(B) at least one component selected from the group consisting of (B-1) polyhydric alcohols, (B-2) vegetable extracts and (B-3) organic acids or salts thereof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the amide derivative (1) represented by the general formula (1) of the component (A) useful in the practice of the present invention, R^1 and R^2 are identical to or different from each other and are, independently, a linear or branched and saturated or unsaturated hydrocarbon group having 1 to 40

carbon atoms, which may be hydroxylated. Examples of R^1 and R^2 include methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, heneicosyl, docosyl, nonacosyl, triacontyl, isostearyl, isoheptadecyl, 2-ethylhexyl, 1-ethylheptyl, 8-heptadecyl, 8-heptadecenyl, 8,11-heptadecadienyl, 2-heptylundecyl, 9-octadecenyl, 1-hydroxynonyl, 1-hydroxypentadecyl, 2-hydroxypentadecyl, 15-hydroxypentadecyl, 11-hydroxyheptadecyl, and 11-hydroxy-8-heptadecenyl.

As R^1, linear or branched alkyl or alkenyl groups having 8 to 26 carbon atoms are preferred. Examples thereof include octyl, decyl, dodecyl, tetradecyl, hexadecyl, octadecyl, docosyl, triacontyl, isostearyl, 2-ethylhexyl, 2-heptylundecyl, and 9-octadecenyl. Linear or branched alkyl groups having 12 to 22 carbon atoms are particularly preferred hydrocarbon groups as R^1. Examples thereof include dodecyl, tetradecyl, hexadecyl, octadecyl, docosyl, and methyl-branched isostearyl groups.

As R^2, linear or branched alkyl or alkenyl groups having 9 to 25 carbon atoms are preferred. Examples thereof include nonyl, undecyl, tridecyl, tetradecyl, pentadecyl, heptadecyl, heneicosyl, nonacosyl, isoheptadecyl, 1-ethylheptyl, 8-heptadecyl, 8-heptadecenyl, 8,11-heptadecadienyl, 1-hydroxynonyl, 1-hydroxypentadecyl, 2-hydroxypentadecyl, 15-hydroxypentadecyl, 11-hydroxyheptadecyl, and 11-hydroxy-8-heptadecenyl. Linear or branched alkyl groups having 11 to 21 carbon atoms are particularly preferred hydrocarbon groups as

R^2. Examples thereof include undecyl, tridecyl, tetradecyl, pentadecyl, heptadecyl, heneicosyl, and methyl-branched isoheptadecyl groups.

R^3 is a linear or branched alkylene group having 1 to 6 carbon atoms, or a single bond. Examples of the alkylene group include methylene, ethylene, trimethylene, tetramethylene, pentamethylene, hexamethylene, 1-methylethylene, 1-methyltrimethylene, 2-methyltrimethylene, 1,1-dimethylethylene, 1-ethylethylene, 1-methyltetramethylene, and 2-ethyltrimethylene. As R^3, linear alkylene groups having 1 to 6 carbon atoms are preferred with methylene, ethylene, and trimethylene groups being particularly preferred.

R^4 is a hydrogen atom, a linear or branched alkoxyl group having 1 to 12 carbon atoms, or a 2,3-dihydroxypropyloxy group. Examples of the alkoxyl group include methoxy, ethoxy, propoxy, butoxy, hexyloxy, octyloxy, decyloxy, 1-methylethoxy and 2-ethylhexyloxy. As R^4, a hydrogen atom, alkoxy groups having 1 to 8 carbon atoms and a 2,3-dihydroxypropyloxy group are preferred with a hydrogen atom, and methoxy, ethoxy, propoxy, butoxy, 1-methylethoxy, 2-ethylhexyloxy, and 2,3-dihydroxypropyloxy groups being particularly preferred.

Of the amide derivatives (1), particularly preferred are compounds in which R^1, R^2, R^3, and R^4 in the general formula (1) are groups respectively selected from the particularly preferred groups respectively mentioned above.

In the amide derivative (2) represented by the general formula (2) of the component (A) useful in the practice of the present invention, examples of R^{1a} include the same groups as

those in R^2 of the amide derivative (1) except that methyl, ethyl and propyl are excluded. Preferred groups are the same groups as those in R^1. Examples of R^{3a} include the alkylene groups exemplified as R^3 of the amide derivative (1) except that methylene and ethylene are excluded. Preferred groups are the same as those in R^3. As R^{3a}, linear alkylene groups having 3 to 6 carbon atoms are preferred with trimethylene being particularly preferred. Examples of the alkoxyl group represented by R^{4a} include the same groups as those in R^4 of the amide derivative (1). Preferred groups are the same groups as those in R^4.

Of the amide derivatives (2), particularly preferred are compounds in which R^{1a}, R^{3a} and R^{4a} in the general formula (2) are groups respectively selected from the particularly preferred groups respectively mentioned above.

In the amide derivative (3) represented by the general formula (3) of the component (A) useful in the practice of the present invention, R^1, R^2, R^{3a}, and R^{4a} have the same meaning as defined above, and the same groups as those mentioned above are preferred.

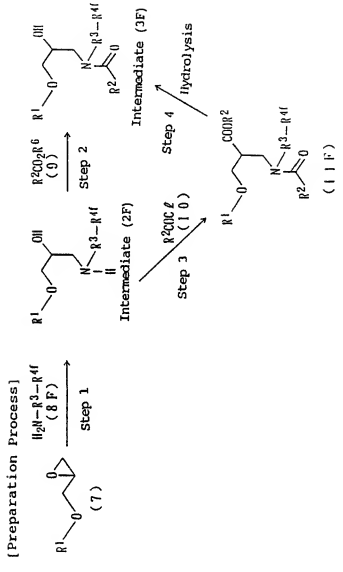
Of the amide derivatives (3), particularly preferred are compounds in which R^1, R^2, R^{3a}, and R^{4a} in the general formula (3) are groups respectively selected from the particularly preferred groups respectively mentioned above.

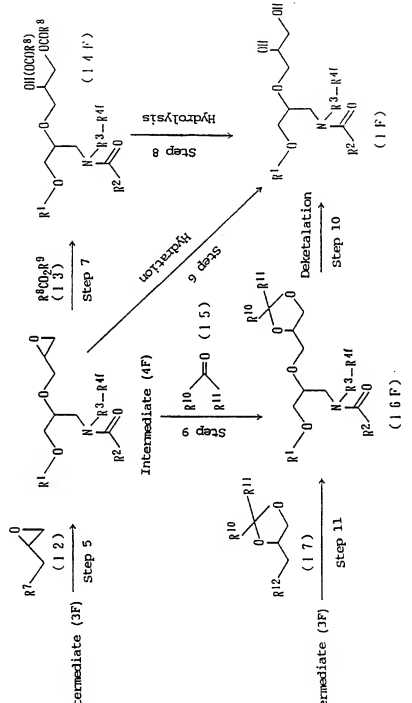
In the amide derivative (4) represented by the general formula (4) of the component (A) useful in the practice of the present invention, R^1, R^2, and R^3 have the same meaning as defined above, and R^{4b} is a hydrogen atom, a linear or branched

alkoxyl group having 1 to 12 carbon atoms, or an 2,3-epoxypropyloxy group. Specific examples of R^1, R^2, and R^3 include the same groups as those in the amide derivatives (1). Examples of the linear or branched alkoxyl group having 1 to 12 carbon atoms represented by R^{4b} include the same groups as those in R^4, with a hydrogen atom, the same alkoxyl groups as those in R^4 and a 2,3-epoxypropyloxy group being preferred.

Of the amide derivatives (4), particularly preferred are compounds in which R^1, R^2, R^3, and R^{4b} in the general formula (4) are groups respectively selected from the particularly preferred groups respectively mentioned above.

The amide derivative (1) of the component (A) useful in the practice of the present invention can be obtained, for example, in accordance with the following preparation process:


[Preparation Process]
(7)
Step 1
(8F)
Intermediate (2F)
Step 2
(9)
Intermediate (3F)
Step 3
(10)
Step 4
Hydrolysis
(11F)


Intermediate (3F)
(12)
Step 5
Intermediate (4F)
Step 7
(13)
Step 8
Hydrolysis
(14F)
Hydration
Step 6
Step 9
(15)
Deketalation
Step 10
(1F)
(16F)
Intermediate (3F)
(17)
Step 11

wherein R^1, R^2, and R^3 have the same meaning as defined above, 4f is a hydrogen atom or a linear or branched alkoxyl group having 1 to 12 carbon atoms, with the proviso that when R^3 is a single bond, R^{4f} is a hydrogen atom, R^5, R^9, R^{10}, and R^{11} are, independently, a linear or branched and saturated or unsaturated hydrocarbon group having 1 to 8 carbon atoms, preferably, a linear or branched alkyl group having 1 to 5 carbon atoms, particularly preferably, a methyl group, R^9 is a hydrogen atom, alkali metal atom or COR^8 group, and R^7 and R^{12} are leaving groups such as a halogen atom, mesylate group or tosylate group. R^7 is preferably a chlorine or bromine atom, particularly, a chlorine atom from the viewpoint of easy availability and the like. R^{12} is a mesylate or tosylate group from the viewpoint of easy availability and the like.

The reaction conditions for the respective steps in the above preparation process are as follows.

Step 1):

Glycidyl ether (7) is reacted with an amine (8F) at a temperature from room temperature to 150°C either without any solvent or in a solvent, such as water, a lower alcohol such as methanol, ethanol or isopropanol, an ether such as tetrahydrofuran, dioxane or ethylene glycol dimethyl ether, a hydrocarbon such as hexane, benzene, toluene or xylene, or an optionally mixed solvent thereof, whereby an aminoalcohol derivative (2F) can be prepared.

Step 2):

A fatty acid ester (9), preferably, a lower alkyl ester of a fatty acid such as the methyl ester or ethyl ester of a

fatty acid is reacted with the aminoalcohol derivative (2F) in the presence of a basic catalyst, such as an alkali metal hydroxide such as potassium hydroxide or sodium hydroxide, an alkaline earth metal hydroxide such as calcium hydroxide, an alkali metal carbonate such as potassium carbonate, an alkaline earth metal carbonate such as calcium carbonate, or an alkali metal alcoholate such as sodium methoxide, sodium ethoxide or potassium tert-butoxide at a temperature from room temperature to 150°C under a pressure ranging from atmospheric pressure to a reduced pressure of 0.01 mmHg, whereby an amide derivative (3F) can be prepared. At this time, the amount of the basic catalyst to be used is preferably 0.01-0.2 equivalents of the aminoalcohol derivative (2F). In addition, the reaction may preferably be conducted while removing an alcohol formed by the reaction from the system so that the reaction progresses quickly.

Step 3):

The amide derivative (3F) can also be prepared by reacting the aminoalcohol derivative (2F) with a fatty acid chloride (10) at a temperature from room temperature to 100°C in the presence or absence of a base such as pyridine or a tertiary amine such as triethylamine either without any solvent or in a solvent, such as a halogenated hydrocarbon such as chloroform, methylene chloride or 1,2-dichloroethane, an ether such as tetrahydrofuran, dioxane or ethylene glycol dimethyl ether, a hydrocarbon such as hexane, benzene, toluene or xylene, or an optionally mixed solvent thereof, thereby

converting the aminoalcohol derivative into an amide-ester derivative (11F), and then

Step 4):

selectively hydrolyzing the ester group of the amide-ester derivative (11F) under basic conditions, i.e., in the presence of an alkali metal hydroxide such as potassium hydroxide or sodium hydroxide, an alkaline earth metal hydroxide such as calcium hydroxide, an alkali metal carbonate such as potassium carbonate, an alkaline earth metal carbonate such as calcium carbonate, or an alkali metal alcoholate such as sodium methoxide, sodium ethoxide or potassium tert-butoxide.

Step 5):

The amide derivative (3F) is reacted with 1 to 20 equivalents of an epoxide, preferably, epichlorohydrin at room temperature in the presence of 1 to 10 equivalents of an alkali metal hydroxide such as potassium hydroxide or sodium hydroxide, an alkali metal carbonate such as potassium carbonate, an alkaline earth metal hydroxide such as calcium hydroxide, or an alkaline earth metal carbonate such as calcium carbonate without any solvent or in a solvent, such as water, an ether such as tetrahydrofuran, dioxane or ethylene glycol dimethyl ether, a hydrocarbon such as hexane, benzene, toluene or xylene, or an optionally mixed solvent thereof, whereby an amide derivative (4F) can be prepared. At this time, it is preferable from the viewpoint of yield to conduct the reaction in the presence of a phase transfer catalyst, such as a quaternary ammonium salt such as tetrabutylammonium

bromide, tetrabutylammonium chloride, hexadecyltrimethylammonium chloride, hexadecyltrimethylammonium bromide, stearyltrimethylammonium chloride or bistetraoxyethylenestearylmethylammonium chloride, or a betaine such as lauryldimethylcarboxyammonium betaine.

Step 6):

The amide derivative (4F) is hydrated at a temperature from room temperature to 300°C under basic conditions, i.e., in the presence of an alkali metal hydroxide such as potassium hydroxide or sodium hydroxide, an alkaline earth metal hydroxide such as calcium hydroxide, an alkali metal carbonate such as potassium carbonate, or an alkaline earth metal carbonate such as calcium carbonate, under acidic conditions, i.e., in the presence of a mineral acid such as sulfuric acid or hydrochloric acid, a Lewis acid such as boron trifluoride or tin tetrachloride, a carboxylic acid such as acetic acid, tetradecanoic acid or hexadecanoic acid, or a sulfonic acid such as p-toluenesulfonic acid, or under base-acid mixing conditions, whereby an amide derivative (1F) can be prepared.

Step 7):

The amide derivative (1F) can also be prepared by reacting the amide derivative (4F) with a carboxylic acid derivative (13), preferably, a lower fatty acid such as acetic acid, an alkali metal salt of a lower fatty acid such as sodium acetate, or a lower fatty acid anhydride such as acetic anhydride, said compounds may be used either singly or in any combination thereof, in the presence or absence of a basic catalyst, such as a tertiary amine such as triethylamine,

thereby converting the amide derivative into an ester-amide derivative (14F), and then

Step 8):

selectively hydrolyzing the ester group of the esteramide derivative (14F) under basic conditions, i.e., in the presence of an alkali metal hydroxide such as potassium hydroxide or sodium hydroxide, an alkaline earth metal hydroxide such as calcium hydroxide, an alkali metal carbonate such as potassium carbonate, an alkaline earth metal carbonate such as calcium carbonate, or an alkali metal alcoholate such as sodium methoxide, sodium ethoxide or potassium tert-butoxide.

Step 9):

Further, the amide derivative (1F) can also be prepared by reacting the amide derivative (4F) with a carbonyl compound (15), preferably, a lower aliphatic ketone such as acetone or methyl ethyl ketone in the presence of an acid catalyst, such as a mineral acid such as sulfuric acid, hydrochloric acid or phosphoric acid, a carboxylic acid such as acetic acid, or a Lewis acid such as boron trifluoride or tin tetrachloride, thereby converting the amide derivative into a 1,3-dioxolan-amide derivative (16F), and then

Step 10)

subjecting the 1,3-dioxolan-amide derivative (16F) to deketalation under acidic conditions, i.e., in the presence of a mineral acid such as sulfuric acid, hydrochloric acid or phosphoric acid, a carboxylic acid such as acetic acid, or a sulfonic acid such as p-toluenesulfonic acid.

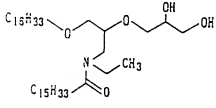
Step 11):

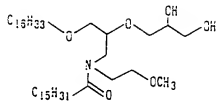
The 1,3-dioxolan-amide derivative (16F) can also be prepared by reacting the amide derivative (3F) with a glycerol derivative (17) in the presence of a base, such as an alkali metal hydroxide such as potassium hydroxide or sodium hydroxide, an alkaline earth metal hydroxide such as calcium hydroxide, an alkali metal carbonate such as potassium carbonate, an alkaline earth metal carbonate such as calcium carbonate, or an alkali metal hydride such as sodium hydride either without any solvent or in a solvent, such as an aprotic polar solvent such as N,N-dimethylformamide or dimethylsulfoxide, an ether such as tetrahydrofuran, dioxane or ethylene glycol dimethyl ether, a hydrocarbon such as hexane, benzene, toluene or xylene, or an optionally mixed solvent thereof.

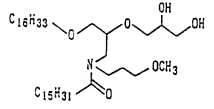
The thus-obtained amide derivative (1) of the component (A) useful in the practice of the present invention can be purified by any known method. When the amide derivative is incorporated into a cosmetic composition, it has excellent effects and performance, and offers no problem of safety even if it is a mixture containing intermediates and by-products without conducting any particular purification and has a purity of 70-100%. Any solvates typified by hydrates are also included in the compounds of the component (A) useful in the practice of the present invention.

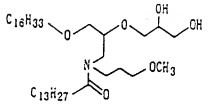
Examples of the amide derivatives of the component (A) useful in the practice of the present invention, which are represented by the general formula (1) and obtained in

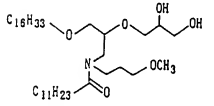
accordance with the above preparation process, include the following compounds:

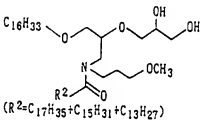


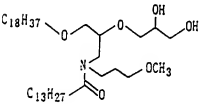


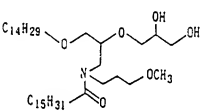


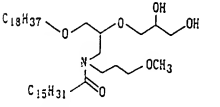


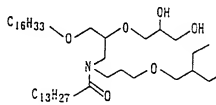


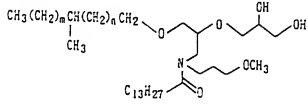




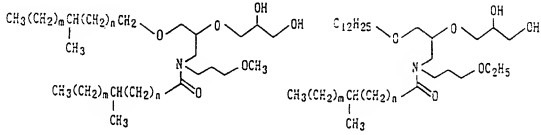






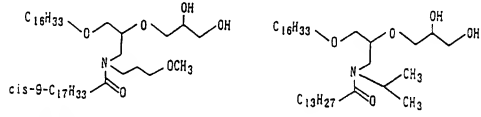


(m and n are such numbers that m + n is 10 to 16, m is 4 to 10, n is 4 to 10, and m and n are distributed with peaks at m = 7 and n = 7.)



(m and n have the same meaning as defined above)

(m and n have the same meaning as defined above)



The amide derivatives of the component (A) may be used either singly or in any combination thereof. No particular limitation is imposed on the amount of the component (A) to be incorporated. However, it is particularly preferable from the viewpoint of effects in enhancing the water-retaining ability of the horny layer, improving skin roughness and preventing the formation of wrinkles to incorporate the component (A) in a proportion of 0.001 to 50 wt.% (hereinafter indicated merely by "%"), more preferably 0.1 to 20%, most preferably 0.1 to 10%, based on the total weight of the composition.

No particular limitation is imposed on the polyhydric alcohols of the component (B-1) useful in the practice of the

present invention. However, examples thereof include glycerol, polyglycerols such as diglycerol, triglycerol and tetraglycerol, ethylene glycol, 1,3-butylene glycol, 1,4-butylene glycol, propylene glycol, dipropylene glycol, polyethylene glycol, 1,3-propanediol, glucose, mantose, maltitol, sucrose, fructose, xylitol, sorbitol, maltotriose, threitol, erythritol, alcohols obtained by reduction of amylolytic sugar, sorbit, and polyoxyalkylene alkylglucosides. Of these, glycerol, 1,3-butylene glycol, and 1,3-propanediol are particularly preferred.

The polyhydric alcohols of the component (B-1) may be used either singly or in any combination thereof. No particular limitation is imposed on the amount of the component (B-1) to be incorporated. However, it is preferable from the viewpoint of synergistically enhancing the water-retaining ability of the horny layer and enhancing the effects of improving skin roughness and preventing the formation of wrinkles to incorporate the component (B-1) in a proportion of 0.001 to 50%, more preferably 0.01 to 30%, most preferably 0.1 to 20%, based on the total weight of the composition.

Examples of the vegetable extracts of the component (B-2) useful in the practice of the present invention include those obtained from plants such as Angelica keiskei, adzuki bean, avocado, hydrangea, Gynostemma pentaphyllum, ARUTEKA, arnica, almond, aloe, apricot, nettle, iris, fennel, turmeric, EIJITSU, Scutellariae radix, Amur cork tree, goldthread, barley, gumbo, Saint-John's-wort, dead nettle, ONONISU, watercress, persimmon, the root of kudzu, Valeriana fauriei,

birch, cattail, chamomile, chamomilla, oats, licorice, raspberry, kiwi, cucumber, apricot, coconut, Cape jasmine, Sasa albo-marginata, a walnut, cinnamon, mulberry, GUNJO, gentian, cranesbill, burdock, sesame, wheat, rice, Camellia sasanqua, saffron, hawthorn, Japanese pepper tree, mushroom, Rehmannia glutinosa, prop root, beefsteak plant, Japanese linden, Filipendula multijuga, peony, ginger, calamus, white birch, Japanese honeysuckle, field horsetail, Stevia rebaudiana Bertoni, western ivy, western hawthorn, elder, needle juniper, milfoil, mint, sage, common mallow, Cnidium officinale, Japanese green gentian, soybean, DAISO, thyme, tea plant, clove, dried orange peal, evening primrose, camellia, Centella asiatica, English walnut, Angelica acutiloba, pot marigold, ginseng, orange peal, corn, Houttuynia cordata, tomato, carrot, garlic, wild rose, malt, parsley, rye, adlay, Japanese mint, papaya, hamamelis, rose, white cedar, sunflower, loquat, butterbur, dandelion, grapes, placenta, hazelnut, dishcloth gourd, safflower, bo tree, peony, hop, macadamia nut, pine, horse chestnut, melissa, melilot, peach, malt, Rodger's bronze leaf, palm, eucalyptus, creeping saxifrage, lily, YOKUININ, mugwort, rye, peanut, lavender, apple, litchi, lettuce, lemon, Chinese milk vetch, rosemary, camomile, agrimony, Japanese catalpa, hiba arborvitae, HORUTOSO, Isodon japonicus Hara, KIJITSU, SENKISHI, chickweed, duckweed, mugwort, ginkgo, Chinese bellflower, chrysanthemum, soapberry and weeping golden bell.

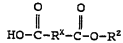
Of these, extracts from hamamelis, peony, agrimony, Japanese catalpa, hiba arborvitae, HORUTOSO, Isodon laponicus

Hara and KIJITSU are particularly preferred in the present invention.

The extracts can be obtained by grinding the whole of the respective plants or one or more of their parts (hereinafter referred to as "stocks" such as leaves, bark, roots, branches, seeds or fruits or nuts, and flowers or blossoms after drying them or without drying them, and then extracting them either with a solvent or by means of an extractor such as a Soxhlet's extractor at ordinary temperature or an elevated temperature. No particular limitation is imposed on the solvent used here. However, examples thereof include known solvents, such as water, primary alcohols such as methyl alcohol and ethyl alcohol, liquid polyhydric alcohols such as propylene glycol and 1,3-butylene glycol, lower alkyl esters such as ethyl acetate, hydrocarbons such as benzene and hexane, ethyl ether, and acetone. These solvents may be used either singly or in any combination thereof. As a preferable specific example of a method for extracting from the stocks, 1,000 ml of 50 v/v% aqueous ethanol are added to 100 grams of a dry ground product to conduct extraction for 3 days while sometimes stirring at room temperature. The resultant extract is filtered, and the filtrate is left at rest for 3 days at 5°C and then filtered again, thereby obtaining a supernatant. Although the vegetable extract obtained under the above conditions may be used in the form of a solution as extracted, it may be used after treating it by concentration, filtration, drying and/or the like as needed.

The vegetable extracts of the component (B-2) may be used either singly or in any combination thereof. No particular limitation is imposed on the amount of the component (B-2) to be incorporated. However, it is preferable from the viewpoint of achieving sufficient effects in improving skin roughness, preventing the formation of wrinkles and smoothing the wrinkles to incorporate the component (B-2) in a proportion of 0.0001 to 20%, more preferably 0.0001 to 10%, most preferably 0.0001 to 5% in terms of dry solids, based on the total weight of the composition.

No particular limitation is imposed on the organic acids or salts thereof of the component (B-3) useful in the practice of the present invention. However, examples of the organic acids include hydroxycarboxylic acids having 2 to 28 carbon atoms, such as glycolic acid, lactic acid, citric acid and 2-hydroxyoctanoic acid; dicarboxylic acids having 2 to 12 carbon atoms, such as succinic acid, fumaric acid, maleic acid, malonic acid and 1,3-propanedicarboxylic acid; monocarboxylic acids having 10 to 24 carbon atoms, such as stearic acid, palmitic acid, myristic acid, isostearic acid, linolic acid, linolenic acid and arachidonic acid; amino acids such as aspartic acid, asparagin, glycine, glutamic acid, glutamine, γ-aminobutyric acid, arginine, cysteine and alanine; dicarboxylic acid monoesters such as octyl succinate and methyl maleate; and sterol derivatives represented by the general formula (5):



(5)

wherein R^X is $-(CH_2)_l-$ (l is a number of 2 to 10), $-CH_2-\underset{\displaystyle R^Y}{\underset{|}{CH}}-$ or $-\underset{\displaystyle R^Y}{\underset{|}{CH}}-CH_2-$ (R^Y is a linear or branched alkyl or alkenyl group having 6 to 20 carbon atoms), and R^Z is a residue of a natural sterol or a hydrogenated product thereof in which a proton of the hydroxyl group is removed.

Of these sterol derivatives, examples of cholesteryl alkenylsuccinates include those synthesized in accordance with the preparation process described in Japanese Patent Application Laid-Open No. 294989/1993, which is incorporated herein by reference, for example, monocholesteryl n-hexadecenylsuccinate and monocholesteryl n-octadecenylsuccinate.

Preferred as the sterol derivative are those of the general formula (5) in which l is 2 to 5, R^Y is hexadecenyl or octadecenyl, and R^Z is cholesteryl or sitosteryl. As the organic acids of the component (B-3), glycolic acid, lactic acid, citric acid, succinic acid and the sterol derivatives are particularly preferred.

No particular limitation is imposed on the salts of the organic acids of the component (B-3). However, examples thereof include salts of lactic acid, citric acid and succinic acid, and acid-addition salts such as, for example, hydrochlorides, sulfates, nitrates and phosphates when an organic acid has a basic group.

The organic acids or the salts thereof of the component (B-3) may be used either singly or in any combination thereof.

No particular limitation is imposed on the amount of the component (B-3) to be incorporated. However, it is particularly preferable from the viewpoint of the effects of enhancing the water-retaining ability of the horny layer, improving skin roughness and preventing the formation of wrinkles to incorporate the component (B-3) in a proportion of 0.00001 to 30%, more preferably 0.001 to 20%, based on the total weight of the composition.

In the present invention, the components (B-1), (B-2), and (B-3) may be used either singly or in any combination thereof. The combination of the component (B-1) with the component (B-3) is preferred.

When at least one component selected from the following components (C), (D), (E), (F), (G), and (H) is incorporated into the composition according to the present invention in addition to the above-described essential components, it is possible to further enhance the effects of the present invention.

When an acid hetero-polysaccharide derived from the callus of a plant belonging to Polyanthes L. is incorporated as the component (C), the protective effect of the resulting composition on the skin is increased, so that further enhanced effects in improving skin roughness, preventing the formation of wrinkles and smoothing wrinkles are achieved. It is hence preferable to incorporate such a component.

The acid hetero-polysaccharide (hereinafter referred to as "acid polysaccharide") of the component (C) derived from the callus of a plant belonging to Polyanthes L. can be

collected from a culture obtained by culturing the callus derived from a plant belonging to Polyanthes L.. Tuberose (Polyanthes tuberosa L.) may be mentioned as a preferable example of the plant belonging to Polyanthes L.. As the component (C), a modified hetero-polysaccharide derived from the callus of tuberose is preferably used.

In the case of tuberose, the collection of the acid polysaccharide can be conducted, for example, in accordance with the following tissue culture process. Namely, a part of tuberose, such as blossoms, is used as an explant, and 10^{-5} M auxin and 10^{-6} M cytokinin are added as plant hormones to a Linsmaier-skoog basal medium. Further, 3% saccharose is added as a carbon source. After the thus-prepared medium is used to derive callus, subculture is conducted, and a liquid medium composed of the same components as those used in the callus-culture medium is used to conduct shaking culture. Thereafter, cells are removed from the culture solution by centrifugation, filtration or the like, and the remaining culture solution is concentrated by means of a rotary evaporator or the like. The resultant concentrate is added with a solvent such as ethanol or acetone to precipitate the product. The precipitate is lyophilized, whereby the acid polysaccharide can be separated and collected.

It is preferable from the viewpoint of achieving the more satisfactory effects in preventing the dermal aging to incorporate the thus-obtained acid polysaccharide in a proportion of 0.0001 to 20%, more preferably 0.001 to 10%,

most preferably 0.01 to 10%, based on the total weight of the composition.

When a sterol is incorporated as the component (D), the penetration of the components (A) and (B) into the skin is facilitated, so that further enhanced effects in improving skin roughness, preventing the formation of wrinkles and smoothing wrinkles are achieved. It is hence preferable to incorporate such a component. Examples of such a sterol include cholesterol and cholesterol derivatives. As examples of the cholesterol derivatives, may be mentioned cholestanol, cholesteryl esters having a saturated or unsaturated and linear or branched hydrocarbon group having 12 to 36 carbon atoms, preferably 14 to 28 carbon atoms, and dehydrocholesterols. Further, examples of the cholesteryl esters include cholesteryl isostearate, cholesteryl 1,2-hydroxystearate, cholesteryl lanolin fatty acid and cholesteryl ricinoleate. Specific examples of the sterols include cholesterol, cholesteryl isostearate, provitamin D_3, campesterol, stegmastanol, stegmasterol, 5-dihydrocholesterol, α-spinasterol, palysterol, clionasterol, γ-sitosterol, stegmastenol, sargasterol, apenasterol, ergostanol, sitosterol, colubisterol, chondrillasterol, polyphellasterol, haliclonasterol, neospongosterol, fucosterol, aptostanol, ergostadienol, ergosterol, 22-dihydroergosterol, brassicasterol, 24-methylenecholesterol, 5-dihydroergosterol, dehydroergosterol, fungisterol, cholestanol, coprostanol, zymosterol, 7-hetocholesterol, lathosterol, 22-dehydrocholesterol, β-sitosterol, cholestatrien-3β-ol,

coprosterol, cholestenol, ergostenol, 7-dehydrocholesterol, 24-dehydrocholestadien-3β-ol, equilenine, equilin, estrone, 17β-estradiol, androst-4-ene-3β,17β-diol, and dehydroepiandrosterone. These sterols may be used either singly or in any combination thereof.

Of these, cholesterol, cholesteryl isostearate, and cholestanol are particularly preferred.

The sterols of the component (D) may be used either singly or in any combination thereof, and no particular limitation is imposed on its amount to be incorporated. However, it is preferable to incorporate the component (D) in a proportion of 0.01 to 50%, more preferably 0.01 to 40%, most preferably 0.01 to 20%, based on the total weight of the composition.

When an antiphlogistic substance is incorporated as the component (E), the effect of preventing inflammation caused by ultraviolet rays or the like is enhanced, so that further enhanced effects in improving skin roughness, preventing the formation of wrinkles and smoothing wrinkles are achieved. It is hence preferable to incorporate such a component. Examples of such an antiphlogistic substance include glycyrrhizic acid and salts thereof, glycyrrhetinic acid and salts thereof, ε-aminocapronic acid and salts thereof, allantoin, lysozyme hydrochloride, guaiazulene, methyl salicylate, γ-oryzanol and bisabolol. Of these, glycyrrhetinic acid, stearyl glycyrrhetinate, and ε-aminocapronic acid are preferred.

The antiphlogistic substances of the component (E) may be used either singly or in any combination thereof. It is

preferable to incorporate the component (E) in a proportion of 0.001 to 5%, more preferably 0.01 to 2%, most preferably 0.01 to 1%, based on the total weight of the composition.

When a singlet oxygen scavenger or antioxidant is incorporated as the component (F), the effect of detoxicating peroxides and active oxygen is enhanced, so that further enhanced effects in improving skin roughness, preventing the formation of wrinkles and smoothing wrinkles are achieved. It is hence preferable to incorporate such a component. Examples of such a singlet oxygen scavenger or antioxidant include carotenoides such as α-carotene, β-carotene, γ-carotene, lycopene, cryptoxanthin, lutein, zeaxanthin, isozeaxanthin, rhodoxanthin, capsanthin, and crocetin; 1,4-diazacyclooctane, 2,5-dimethylfuran, 2-methylfuran, 2,5-diphenylfuran, 1,3-diphenylisobenzofuran, α-tocopherol, β-tocopherol, γ-tocopherol, d-tocopherol, histidine, tryptophan, methionine, and alanine or alkyl esters thereof; tannins such as dibutylhydroxytoluene, butylhydroxyanisole, ascorbic acid, tannic acid, epicatechin, epicarocatechin, epicatechin gallate, and epicarocatechin gallate; flavonoids such as rutin; enzymes such as superoxide dismutases, catalases, glutathione peroxidases, and glutathione reductases; and Ennds, peralchin, platonin, and capsaichin.

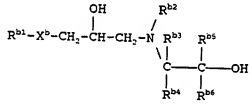
Of these, carotenes, tocopherols, ascorbic acid, tannic acid, epicatechin gallate, and epicarocatechin gallate are preferred.

The singlet oxygen scavengers or antioxidants of the component (F) may be used either singly or in any combination

thereof. It is preferable to incorporate the component (F) in a proportion of 0.001 to 5%, more preferably 0.01 to 2%, most preferably 0.01 to 1% based on the total weight of the composition.

The cosmetic compositions according to the present invention include both skin cosmetic compositions and hair cosmetic compositions.

When an amine derivative represented by the general formula (b):



(b)

wherein R^{b1} is a linear, branched or cyclic hydrocarbon group having 1 to 40 carbon atoms, which may be substituted by at least one hydroxyl group, or a hydrocarbon group having 1 to 5 carbon atom and containing a heteroatom, R^{b2}, R^{b3}, R^{b4}, and R^{b5} are identical to or different from one another and are, independently, a hydrogen atom or a hydrocarbon group having 1 to 20 carbon atoms, which may be substituted by at least one hydroxyl group, and X^b is -O- or -CO-O- with the proviso that the carbonyl group is bonded to R_{b1}, or an acid addition salt thereof is incorporated as the component (G), the effects of improving skin roughness, preventing the formation of wrinkles and smoothing wrinkles, which are brought about by the amine derivative or the acid-addition salt thereof, act synergistically, so that further enhanced effects in improving

skin roughness, preventing the formation of wrinkles and smoothing wrinkles are achieved. It is hence preferable to incorporate such a component. Such an amine derivative is that represented by the general formula (b). Examples of the linear, branched or cyclic hydrocarbon group having 1 to 40 carbon atoms represented by R^{b1} in the general formula (b) include alkyl groups such as methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, eicosyl, heneicosyl, docosyl, tricosyl, tetracosyl, pentacosyl, hexacosyl, heptacosyl, octacosyl, nonacosyl, triacontyl, hentriacontyl, dotriacontyl, tritriacontyl, tetratriacontyl, pentatriacontyl, hexatriacontyl, heptatriacontyl, octatriacontyl, nonatriacontyl, tetracontyl, methyl-branched isostearyl, 2-ethylhexyl, 2-heptylundecyl, 5,7,7-trimethyl-2-(1,3,3-trimethylbutyl)octyl, and isopropyl groups; alkenyl groups such as vinyl, allyl, butenyl, pentenyl, hexenyl, 9-octadecenyl, and 9,12-octadecadienyl groups; alicyclic hydrocarbon groups such as cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl groups; aromatic hydrocarbon groups such as phenyl, naphthyl, tolyl, xylyl, and benzyl groups; and hydrocarbon groups such as a cholesteryl group.

These hydrocarbon groups may be substituted by one or more hydroxyl groups. Examples of such groups include hydroxymethyl, hydroxyethyl, hydroxypropyl, hydroxyhexyl, 2,3-dihydroxypropyl, and 2,2-bis(hydroxymethyl)-3-hydroxypropyl groups.

In the hydrocarbon group having 1 to 5 carbon atoms containing a heteroatom represented by R^{b1}, examples of the heteroatom include oxygen, nitrogen, sulfur, phosphorus, and fluorine atoms. Examples of the hydrocarbon groups containing these atoms include glycosyl, carboxymethyl, aminocarbonylmethyl, and 1-(N,N-dimethylamino)ethyl groups.

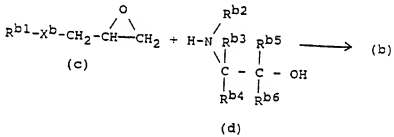
Examples of the hydrocarbon groups having 1 to 20 carbon atoms represented by R^{b2}, R^{b3}, R^{b4}, R^{b5}, and R^{b6} include hydrocarbon groups, such as alkyl groups such as methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, eicosyl, methyl-branched isostearyl, 2-ethylhexyl, 2-heptylundecyl, 5,7,7-trimethyl-2-(1,3,3-trimethylbutyl)octyl, and isopropyl groups; alkenyl groups such as vinyl, allyl, butenyl, pentenyl, hexenyl, 9-octadecenyl, and 9,12-octadecadienyl groups; alicyclic hydrocarbon groups such as cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl groups; and aromatic hydrocarbon groups such as phenyl, naphthyl, tolyl, xylyl, and benzyl groups.

These hydrocarbon groups may be substituted by one or more hydroxyl groups. Examples of such groups include hydroxymethyl, 2-hydroxyethyl, 2-hydroxypropyl, 1,2-dihydroxyethyl, 1,2,3-trihydroxypropyl, 1,2,3-trihydroxybutyl, 1,2,3,4-tetrahydroxybutyl, 1,2,3,4-tetrahydroxypentyl, and 1,2,3,4,5-pentahydroxypentyl groups.

Of such amine derivatives (b), those in which X is -O-, and R^{b2}, R^{b3}, R^{b4}, R^{b5}, and R^{b6} are hydrogen atoms are known

compounds (Japanese Patent Application Laid-open No. 228048/1987, which is incorporated herein by reference). However, their effects on the skin have not been known at all.

The amine derivatives (b) useful in the practice of the present invention are synthesized in accordance with various known processes. For example, they may be synthesized by reacting glycidyl ether or an ester derivative thereof (c) with an amine derivative (d) in accordance with the following reaction scheme:



(c) (d) (b)

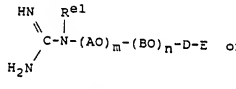
wherein R^{b1}, R^{b2}, R^{b3}, R^{b4}, R^{b5}, and R^{b6} have the same meaning as defined above.

The amine derivative (b) thus obtained may be converted into an inorganic acid salt with hydrochloric acid, sulfuric acid, nitric acid or phosphoric acid, or an organic acid salt with succinic acid, fumaric acid, hexadecanoic acid, octadecanoic acid, lactic acid, glycolic acid, citric acid, tartaric acid or benzoic acid in accordance with the methods known *per se* in the art as needed.

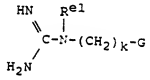
Particularly preferred as the amine derivatives of the component (G) are 1-(2-hydroxyethylamino)-3-isostearyloxy-2-propanol, 1-(2-hydroxyethylamino)-3-(12-hydroxystearyloxy)-2-propanol, and 1-(2-hydroxyethylamino)-3-methyloxy-2-propanol.

The amine derivatives and acid-addition salts thereof of the component (G) may be used either singly or in any combination thereof. No particular limitation is imposed on the amount of the component (G) to be incorporated. However, it is preferable to incorporate the component (G) in a proportion of 0.0001 to 10%, more preferably 0.0001 to 2%, most preferably 0.001 to 1%, based on the total weight of the composition.

When a guanidine derivative represented by the general formula (e) or (f):



(e)



(f)

wherein in the formula (e), A and B may be identical to or different from each other and are, independently, an alkylene group having 2 to 8 carbon atoms, D is a bond, -CO- or an alkylene group having 1 to 6 carbon atoms, which may have a substituent, E is a hydrogen atom, lower alkyl group, aralkyl group or an aryl group which may have a substituent, m is a number of 1 to 6, n is a number of 0 to 6, R^{e1} is a hydrogen atom, lower alkyl group or $-(AO)_m-(BO)_n-D-E$, with the proviso that when R^{e1} is a methyl group, $-(AO)_m-(BO)_n-D-E$ is not a hydroxyethyl group, and in the formula (f), k is a number of 1 to 10, G is a hydrogen atom, hydroxyl group, carboxyl group, sulfonic group or phosphoric group, and R^{e1} has the same meaning as defined above, or an acid-addition salt thereof is incorporated as the component (H), the effects of improving

skin roughness, preventing the formation of wrinkles and smoothing wrinkles, which are brought about by the guanidine derivative or the acid-addition salt thereof, act synergistically, so that further enhanced effects in improving skin roughness, preventing the formation of wrinkles and smoothing wrinkles are achieved. It is hence preferable to incorporate such a component. Such an guanidine derivative is that represented by the general formula (e) or (f). The alkylene groups having 2 to 8 carbon atoms represented by A and B in the general formula (e) may be either linear or branched, and examples thereof include ethylene, trimethylene, tetramethylene, pentamethylene, hexamethylene, and propylene groups. Of these, those having 2 to 6 carbon atoms are preferred with those having 2 to 4 carbon atoms being particularly preferred. Preferable specific examples thereof include ethylene, trimethylene, and propylene groups.

The alkylene group having 1 to 6 carbon atoms represented by D may be either linear or branched, and examples thereof include methylene, ethylene, trimethylene, tetramethylene, pentamethylene, hexamethylene, and propylene groups.

Examples of the lower alkyl group represented by E or R^{21} include linear or branched alkyl groups having 1 to 5 carbon atoms. Specific examples thereof include methyl, ethyl, n-propyl, isopropyl, n-butyl, sec-butyl, tert-butyl, and pentyl groups. Of these a methyl group is particularly preferred.

Examples of the aralkyl group represented by E include those having 7 to 12 carbon atoms, such as benzyl, phenethyl, and naphthylmethyl groups.

Examples of the aryl group represented by E include phenyl and naphthyl groups. Examples of the substituent thereof include an amino group which may be substituted by a lower alkyl group such as a methyl group; a nitro group; a cyano group; a hydroxyl group; a carboxylic residue which may be in an ester form with a lower alkyl group, halogenated lower alkyl group or aralkyl group; a carbamoyl group; halogen atoms such as fluorine, chlorine, bromine and iodine; lower alkyl groups such as methyl, ethyl, propyl and isopropyl groups; and lower alkoxyl groups such as methoxy and ethoxy groups.

m is a number of 1 to 6, preferably 1 to 4. n is a number of 0 to 6, preferably 0 to 4.

In the general formula (f), R^{e1} has the same meaning as defined above. k is a number of 1 to 10, preferably 1 to 5. G is preferably a hydroxyl, carboxyl or phosphoric group.

Examples of the guanidine derivatives represented by such a general formula (e) or (f) include 2-hydroxyethylguanidine, 3-hydroxypropylguanidine, 2-hydroxypropylguanidine, 4-hydroxybutylguanidine, 5-hydroxypentylguanidine, 6-hydroxyhexylguanidine, 2-(2-hydroxyethoxy)ethylguanidine, 2-[2-(2-hydroxyethoxy)ethoxy]ethylguanidine, 1-(3-hydroxypropyl)-1-methylguanidine, 1-(2-hydroxypropyl)-1-methylguanidine, 1-(4-hydroxybutyl)-1-methylguanidine, 1-(5-hydroxypentyl)-1-methylguanidine, 1-(6-hydroxyhexyl)-1-methylguanidine, 1-[2-(2-hydroxyethoxy)ethyl]-1-methylguanidine, 1-[2-(2-(2-hydroxyethoxy)ethoxy)ethyl]-1-methylguanidine, 1,1-bis(2-hydroxyethyl)guanidine, 1,1-bis(3-

hydroxypropyl)guanidine, 1,1-bis(2-hydroxypropyl)guanidine, 1,1-bis(4-hydroxybutyl)guanidine, 1,1-bis(5-hydroxypentyl)guanidine, 1,1-bis(6-hydroxyhexyl)guanidine, 1,1-bis[2-(2-hydroxyethoxy)ethyl]guanidine, 1,1-bis[2-(2-(2-hydroxyethoxy)ethoxy)ethyl]guanidine, (2-methoxyethyl)-guanidine, (2-methoxyethyl)guanidine, (2-ethoxyethyl)-guanidine, (3-methoxypropyl)guanidine, (2-methoxypropyl)-guanidine, (4-methoxybutyl)guanidine, (5-methoxypentyl)-guanidine, 2-(2-methoxyethoxy)ethylguanidine, [2-(2-(2-methoxyethoxy)ethoxy)ethyl]guanidine, 1,1-bis(2-methoxyethyl)guanidine, 1,1-bis(2-ethoxyethyl)guanidine, 1,1-bis(3-methoxypropyl)guanidine, 1,1-bis(2-methoxypropyl)-guanidine, 1,1-bis(4-methoxybutyl)guanidine, 1,1-bis(5-methoxypentyl)guanidine, 1,1-bis(6-methoxyhexyl)guanidine, 1,1-bis[2-(2-methoxyethoxy)ethyl]guanidine, 1,1-bis[2-(2-(2-methoxyethoxy)ethoxy)ethyl]guanidine, 1-(2-methoxyethyl)-1-methylguanidine, 1-(2-ethoxyethyl)-1-methylguanidine, 1-(3-methoxypropyl)-1-methylguanidine, 1-(2-methoxypropyl)-1-methylguanidine, 1-(4-methoxybutyl)-1-methylguanidine, 1-(5-methoxypentyl)-1-methylguanidine, 1-(6-methoxyhexyl)-1-methylguanidine, 1-[2-(2-methoxyethoxy)ethyl-1-methyl]guanidine, 1-[2-(2-(2-methoxyethoxy)ethoxy)ethyl]-1-methylguanidine, 2-guanidinoethyl acetate, 3-guanidinopropyl acetate, 2-guanidino-2-propyl acetate, 4-guanidino-1-butyl acetate, 5-guanidino-1-pentyl acetate, 6-guanidino-1-hexyl acetate, 2-(2-guanidinoethoxy)ethyl acetate, 2-[2-(2-guanidinoethoxy)ethoxy]ethyl acetate, 2-(1-methylguanidino)-ethyl acetate, 3-(1-methylguanidino)propyl acetate, 2-(1-

methylguanidino)-1-methylethyl acetate, 4-(1-methyl-guanidino)butyl acetate, 5-(1-methylguanidino)pentyl acetate, 6-(1-methylguanidino)hexyl acetate, 2-[2-(1-methylguanidino)ethoxy]ethyl acetate, 2-[2-(2-(1-methylguanidino)ethoxy)ethoxy]ethyl acetate, 2-guanidinoethyl benzoate, 3-guanidinopropyl benzoate, 2-guanidino-2-propyl benzoate, 4-guanidino-1-butyl benzoate, 5-guanidinol-1-pentyl benzoate, 6-guanidino-1-hexyl benzoate, 2-(2-guanidinoethoxy)ethyl benzoate, 2-[2-(2-guanidinoethoxy)-ethoxy]ethyl benzoate, 2-(1-methylguanidino)ethyl benzoate, 3-(1-methylguanidino)propyl benzoate, 2-(1-methylguanidino)-1-methylethyl benzoate, 4-(1-methyl-guanidino)butyl benzoate, 5-(1-methylguanidino)pentyl benzoate, 6-(1-methylguanidino)hexyl benzoate, 2-[2-(1-methylguanidino)ethoxy]ethyl benzoate, 2-[-2-(2-(1-methylguanidino)ethoxy)ethoxy]ethyl benzoate, 2-guanidinoethyl salicylate, 3-guanidinopropyl salicylate, 2-guanidino-2-propyl salicylate, 4-guanidino-1-butyl salicylate, 5-guanidino-1-pentyl salicylate, 6-guanidino-1-hexyl salicylate, 2-(2-guanidinoethoxy)ethyl salicylate, 2-[2-(2-guanidinoethoxy)ethoxy]ethyl salicylate, 2-(1-methylguanidino)ethyl salicylate, 3(1-methylguanidino)propyl salicylate, 2-(1-methylguanidino)1-methylethyl salicylate, 4-(1-methylguanidino)butyl salicylate, 5-(1-methylguanidino)pentyl salicylate, 6-(1-methylguanidino)hexyl salicylate, 2-[2-(1-methylguanidino)ethoxy]ethyl salicylate, 2-[2-(2-(1-methylguanidino)ethoxy)ethoxy]ethyl salicylate, 2-guanidinoethyl m- or p-hydroxybenzoate, 3-guanidinopropyl m- or p-hydroxybenzoate, 2-guanidino-2-propyl m- or p-hydroxy-

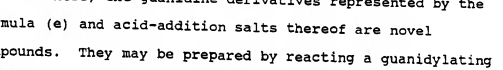
benzoate, 4-guanidino-1-butyl m- or p-hydroxybenzoate, 5-guanidino-1-pentyl m- or p-hydroxybenzoate, 6-guanidino-1-hexyl m- or p-hydroxybenzoate, 2-(2-guanidinoethoxy)ethyl m- or p-hydroxybenzoate, 2[2-(-guanidinoethoxy)ethoxy]ethyl m- or phydroxybenzoate, 2-(1-methylguanidino)ethyl m- or p-hydroxybenzoate, 3-(1-methylguanidino)propyl m- or p-hydroxybenzoate, 2-(1-methylguanidino)-1-methylethyl m- or p-hydroxybenzoate, 4-(1-methylguanidino)butyl m- or p-hydroxybenzoate, 5-(1-methylguanidino)pentyl m- or p-hydroxybenzoate, 6-(1-methylguanidino)hexyl m- or p-hydroxybenzoate, 2-[2-(1-methylguanidino)ethoxy]ethyl m- or p-hydroxybenzoate, 2-[2-(2-(1-methylguanidino)ethoxy)-ethoxy]ethyl m- or p-hydroxybenzoate, 3-guanidinopropionic acid and 2-guanidinoethyl dihydrogenphosphate.

Of these, guanidine derivatives, 2-(2-hydroxyethoxy)-ethylguanidine, 5-hydroxypentylguanidine, 3-guanidinopropionic acid, and 2-guanidinoethyl dihydrogenphosphate are particularly preferred.

The acid used in forming an acid-addition salt of the guanidine derivative may be either an organic acid or an inorganic acid. Examples thereof include monocarboxylic acids such as formic acid, acetic acid, propionic acid, butyric acid, isobutyric acid, hexanoic acid, heptanoic acid, octanoic acid, nonanoic acid, decanoic acid, lauric acid, myristic acid, palmitic acid, stearic acid, acrylic acid, methacrylic acid, crotonic acid, isocrotonic acid, phenylacetic acid, cinnamic acid, benzoic acid, sorbic acid, nicotinic acid, urocanic acid, and pyrrolidonecarboxylic acid; dicarboxylic

acids such as oxalic acid, malonic acid, succinic acid, glutamic acid, adipic acid, pimelic acid, cork acid, azelaic acid, sebacic acid, maleic acid, fumaric acid, phthalic acid, and terephthalic acid; hydroxy acids such as glycolic acid, lactic acid, malic acid, tartaric acid, citric acid, and o-, m- and p-hydroxybenzoic acids; amino acids such as glycine, alanine, β-alanine, valine, leucine, phenylalanine, tyrosine, serine, threonine, methionine, cysteine, cystine, proline, hydroxyproline, pipecolic acid, tryptophan, aspartic acid, asparagine, glutamic acid, glutamine, lysine, histidine, ornithine, arginine, and aminobenzoic acid; lower alkylsulfonic acids such as methanesulfonic acid and trifluoromethanesulfonic acid; arylsulfonic acid such as benzenesulfonic acid, and p-toluenesulfonic acid; hydrohalogenic acids such as hydrofluoric acid, hydrochloric acid, hydrobromic acid, and hydroiodic acid; and inorganic acids such as perchloric acid, sulfuric acid, nitric acid, phosphoric acid, and carbonic acid.

Of these, the guanidine derivatives represented by the formula (e) and acid-addition salts thereof are novel compounds. They may be prepared by reacting a guanidylating reagent with an amine derivative (g), for example, in accordance with the following reaction scheme:



wherein A, B, D, E, m, n and R^{e1} have the same meaning as defined above.

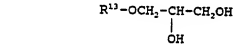
Specific examples of the amine derivative (g), which is a raw material, include 2-(2-aminoethoxy)ethanol, 2-(2(2-aminoethoxy)ethoxy)ethanol, 1-amino-2-propanol, 2-(2-N-methylaminoethoxy)ethanol, 2-(2-(2-N-methylaminoethoxy) ethoxy)ethanol, 1-N-methylamino-2-propanol, N,N-bis-(2-(2-hydroxyethoxy)ethyl)amine, N,N-bis-(2-(2-hydroxyethoxy)-ethoxy)ethyl)amine, N,N-di-(2-hydroxypropyl)amine, 3-N-methylamino-1-propanol, 4-N-methylamino-1-butanol, 5-N-methylamino-1-pentanol, 6-N-methylamino-1-hexanol, di-3-propanolamine, di-4-butanolamine, di-5-pentanolamine, di-6-hexanolamine, 2-(2-methoxyethoxy)ethylamine, 2-[2-(2-methoxyethoxy)ethoxy]ethylamine, 2-methoxy-1-propylamine, N-methyl-2-(2-methoxyethoxy)ethylamine, N-methyl-2-[2-(2-thoxyethoxy)ethoxy]ethylamine, N-methyl-2-methoxypropylamine, N,N-bis[2-(2-methoxyethoxy)ethyl]amine, N,N-bis-[2(2-(2-methoxyethoxy)ethoxy)ethyl]amine, N,N,-di-2methoxypropylamine, N-methyl-3-methoxypropylamine, N-methyl-4-methoxybutylamine, N-methyl-5-methoxypentylamine, N-methyl-6-methoxyhexylamine, N,N-di-3-methoxypropylamine, N,N-4-methoxybutylamine, N,N-di-5-methoxypentylamine, and N,N-di-6-methoxyhexylamine.

The guanidine derivatives and acid-addition salts thereof of the component (H) may be used either singly or in any combination thereof. The component (H) is incorporated in a proportion of 0.001 to 50%, preferably 0.001 to 30%, more preferably 0.01 to 20%, based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain surfactants as needed. As such

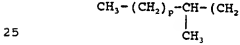
a surfactant, any of nonionic surfactants, anionic surfactants, and amphoteric surfactants may be suitably used.

Examples of the nonionic surfactants include polyoxyethylene alkyl ethers, polyoxyethylene alkyl phenyl ethers, polyoxyethylene fatty acid esters, sorbitan fatty acid esters, polyoxyethylene sorbitan fatty acid esters, polyoxyethylene sorbitol fatty acid esters, fatty acid nonoglycerides, polyoxyethylene hardened castor oil, polyoxyethylene hardened castor oil alkylsulfates, polyoxyethylene alkylsulfates, polyglycerol fatty acid esters, sucrose fatty acid esters, glycerol fatty acid esters, alkylphosphates, polyoxyethylene alkyl phosphates, alkali metal salts of fatty acids, and alkyl glyceryl ethers. Among these, glyceryl ethers represented by the following general formula (18):



(18)

wherein R^{13} is an alkyl group having 8 to 24 carbon atoms, are preferred. Particularly preferred are glyceryl ethers of the formula (18) in which R^{13} is represented by the following formula (19):



(19)

wherein p is an integer of 4 to 10, q is an integer of 5 to 11, and p + q is 11 to 17 and is distributed with a peak at q = 8.

Examples of the anionic surfactants include linear or branched alkylbenzenesulfonates, linear or branched alkyl (or alkenyl) ether sulfates, alkyl- or alkenylsulfates having an alkyl or alkenyl group, olefinsulfonate, alkanesulfonates, unsaturated fatty acid salts, alkyl (or alkenyl) ether carboxylates, α-sulfo-fatty acid salts or esters having an alkyl or alkenyl group, N-acylamino acid type surfactants having an acyl group and a free carboxylic acid residue, and mono- or diphosphate type surfactants having an alkyl or alkenyl group.

Examples of the amphoteric surfactants include imidazoline type amphoteric surfactants having an alkyl, alkenyl or acyl group, and carbobetaine, amidobetaine, sulfobetaine, hydroxysulfobetaine and amidosulfobetaine type amphoteric surfactants.

These surfactants may be used either singly or in any combination thereof. When these surfactants are incorporated, they may preferably be incorporated in a proportion of 0.01 to 20%, more preferably 0.1 to 5%, based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain oily substances. No particular limitation is imposed on the oily substance, and examples thereof include hydrocarbons such as solid and liquid paraffins, vaseline, crystal oil, ceresin, ozocerite, montan wax, squalane and squalene; ester oils such as eucalyptus oil, hardened palm oil, coconut oil, peppermint oil, evening primrose oil, beeswax, camellia oil, almond oil, cacao oil,

castor oil, sesame oil, macadamia nut oil, sunflower oil, peanut oil, avocado oil, beef tallow, lard, horse fat, yolk fat, olive oil, carnauba wax, lanolin, hydrogenated lanolin, jojoba oil, glyceryl monostearate, glyceryl distearate, glyceryl monooleate, myristyl palmitate, cetyl palmitate, cetyl 16-hydroxypalmitate, cetyl isooctanoate, isopropyl palmitate, isobutyl palmitate, isopropyl stearate, butyl stearate, isocetyl stearate, isopropyl myristate, 2-octyldodecyl myristate, hexyl laurate, isopropyl laurate, decyl oleate, neopentylglycol caprate, diethyl phthalate, myristyl lactate, diisopropyl adipate, hexadecyl adipate, cetyl myristate, myristyl lactate, diisostearyl malate, diisopropyl adipate, cetyl lactate, 1-isostearyl-3-myristoylglycerol, cetyl 2-ethylhexanoate, 2-ethylhexyl palmitate, neopentylglycol di-2-ethylhexanoate, 2-octyldodecyl oleate, glycerol triisostearate, glyceryl di-p-methoxycinnamate-mono-2-ethylhexanoate, pentaerythritol tetraesters, glycerol triesters, and glycerol tri-2-ethylhexanoate; higher alcohols such as benzyl alcohol, isocetyl alcohol, isostearyl alcohol, behenyl alcohol, hexadecyl alcohol, phenylethyl alcohol, cetanol, stearyl alcohol, oleyl alcohol, 2-octyldodecanol, palmityl alcohol, and 2-hexyldecanol; and phospholipids, naturally extracted sphingosine derivatives and synthetic substances thereof (for example, glycosyl ceramides, glactosyl ceramides, ceramides, etc.). These oily substances may be used either singly or in any combination thereof.

When these oily substances are incorporated, they may preferably be incorporated in a proportion of 0.001 to 50%, particularly preferably 0.005 to 30% based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain powders. Examples of these powders include inorganic powders such as silicic acid, silicic acid anhydride, magnesium silicate, talc, kaolin, mica, bentonite, mica coated with titanium, iron oxide red, bismuth oxychloride, zirconium oxide, magnesium oxide, zinc oxide, titanium oxide, calcium carbonate, magnesium carbonate, iron oxide, ultramarine blue, iron blue, chromium oxide, chromium hydroxide, calamine, zeolite, and carbon black; various resin powders such as polyamide, polyester, polyethylene, polypropylene, polystyrene, polyurethane, vinyl resins, urea resins, phenol resins, fluororesins, silicone resins, acrylic resins, melamine resins, epoxy resins, polycarbonate resins and divinylbenzene-styrene copolymers, and copolymer resin powers composed of two or more resins thereof; organic powders such as Celluloide, acetylcellulose, polysaccharides, proteins, and scleroproteins; various organic pigment powders such as Red Color No. 201, Red Color No. 202, Red Color No. 204, Red Color No. 205, Red Color No. 220, Red Color No. 226, Red Color No. 228, Red Color No. 405, Orange Color No. 203, Orange Color No. 204, Yellow Color No. 204, Yellow Color No. 401, and Blue Color No. 404; pigment powders composed of zirconium, barium or aluminum lake, or the like, such as Red Color No. 3, Red Color No. 104, Red Color No. 106,

Red Color No. 227, Red Color No. 230, Red Color No. 401, Red Color No. 505, Orange Color No. 205, Yellow Color No. 4, Yellow Color No. 5, Yellow Color No. 202, Yellow Color No. 203, Green Color No. 3 and Blue Color No. 1; and metal soaps such as magnesium stearate, calcium stearate, zinc laurate and zinc palmitate. These powders may be subjected to a surface treatment such as a silicone treatment with methyl hydrogenmethylpolysiloxane, trimethylsiloxysilicic acid, methylpolysiloxane or the like; a fluorine treatment with a perfluoroalkyl phosphate, perfluoroalcohol or the like; an amino acid treatment with N-acylglutamic acid or the like; a lecithin treatment, a metal soap treatment, a fatty acid treatment or an alkylphosphate treatment before their use. Two or more of these powders may also be used in combination.

When these powders are incorporated, their proportion in the skin cosmetic composition may be suitably determined according to the preparation form of the composition. However, it is generally preferable to incorporate them in a proportion of 0.001 to 50%, particularly preferably 0.005 to 30% based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain silicones. No particular limitation is imposed on the silicones so far as they are routinely incorporated in cosmetic compositions. Examples thereof include octamethylpolysiloxane, tetradecamethylpolysiloxane, methylpolysiloxane, high-polymeric methylpolysiloxane and methylphenylpolysiloxane, and besides methylpolycyclosiloxanes such as octamethyl-

cyclotetrasiloxane and decamethylcyclopentasiloxane, trimethylsiloxysilicic acid, and modified silicones such as polyether-alkyl-modified silicones and specific modified organopolysiloxanes described in Japanese Patent Application Laid-Open No. 72851/1994, which is incorporated herein by reference.

When these silicones are incorporated, their proportion in the skin cosmetic composition may be suitably determined according to the preparation form of the composition. However, it is generally preferable to incorporate them in a proportion of 0.001 to 50%, particularly preferably 0.005 to 30% based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain various polysaccharides. Examples of such polysaccharides include xanthan gum, cationic cellulose, sodium hyaluronate, chitin alginate, chitosan, carboxymethylcellulose, methylhydroxypropylcellulose, ι-carrageenan, λ-carrageenan, pullulan, Jew's-ear, ghatti gum, trehalose, and agar.

When these polysaccharides are incorporated, they may be used either singly or in any combination thereof. It is preferable to incorporate them in a proportion of 0.0001 to 20%, particularly preferably 0.001 to 10%, based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain various amino acids. Examples of such amino acids include neutral amino acids such as glycine, serine, cystine, alanine, threonine, cysteine,

valine, phenylalanine, methionine, leucine, tyrosine, proline, isoleucine, tryptophan, and hydroxyproline; acidic amino acids such as aspartic acid, asparagine, glutamine and glutamic acid; basic amino acids such as arginine, histidine and lysine; and besides, as betaine and amino acid derivatives, acylsarcosine and salts thereof, acylglutamic acid and salts thereof, acyl-β-alanine and salts thereof, glutathione, pyrrolidonecarboxylic acid and salts thereof; and oligopeptides such as glutathin, carnosin, gramcidin S, tyrocidine A and tyrocidine B, and guanidine derivatives and salts thereof described in Japanese Patent Application Laid-open No. 228023/1994, which is incorporated herein by reference.

When these amino acids are incorporated, they may be used either singly or in any combination thereof. It is preferable to incorporate them in a proportion of 0.001 to 50%, particularly preferably 0.001 to 30%, based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain film-forming ingredients. Examples of such film-forming ingredients include vinyl polymers such as polyvinyl alcohol, polyvinyl pyrrolidone, sodium polyacrylate; emulsions such as chitosan pullulan emulsions and alkyl acrylate copolymer emulsions; polypeptides such as soluble collagen, hydrolyzed elastin, and silk extract; and polyethylene glycol having a molecular weight of 20,000 to 4,000,000.

When these film-forming ingredients are incorporated, they may preferably be incorporated in a proportion of 0.001 to 10%, particularly preferably 0.001 to 5% based on the total weight of the composition.

The skin cosmetic compositions according to the present invention may further contain a pH adjustor. No particular limitation is imposed on such pH adjustor. However, examples thereof include metal hydroxides such as sodium hydroxide, potassium hydroxide and lithium hydroxide, triethanolamine, isopropanolamine, diisopropanolamine, urea, ε-aminocarponic acid, sodium pyrrolidone carboxylate, sodium hydrogenphosphate, and betaines such as glycine betaine and lysine betaine.

The skin cosmetic compositions according to the present invention are preferably adjusted to a pH within a range of 2 to 11, particularly 3 to 10.

Besides the above ingredients, various ingredients incorporated routinely in cosmetic compositions, quasidrugs, drugs and the like may be incorporated in the skin cosmetic compositions according to the present invention within limits not impeding the object of the present invention. As examples of such ingredients, may be mentioned inorganic salts such as magnesium sulfate, potassium sulfate, sodium sulfate, magnesium chloride and sodium chloride; viscosity modifiers such as polyvinyl alcohol, carboxyvinyl polymers, gelatin, tragacanth gum, pectin, mannan, locust bean gum, galactan, gum arabic, xanthan gum, dextran, succinoglucan, curdlan, quince seed, soageena, casein, albumin, sodium polyacrylate,

polyvinyl pyrrolidone, poly (vinyl methyl ether), hydroxyethylcellulose, ethylcellulose, hydroxypropylcellulose, starch, carboxymethyl starch, methyl starch, agarose, propylene glycol alginate, and guar gum; hydrophilic moisture-absorbing substances known as natural moisturizing factors (NMF), or derivatives thereof; antiseptics such as parabens, and dehydroacetic acid and salts thereof; sequestering agents such as edetic acid and salts thereof, and metaphosphoric acid and salts thereof; beautifying ingredients such as arbutin, kojic acid and placenta extract; cell activators such as collagen, cycosaponin, royal jelly, fetal bovine serum extract, bovine spleen extract, bovine placenta extract, epichlestanol, ribonucleic acid; and besides ultraviolet absorbents, urea, coloring matter, various vitamins, sebum-secretion depressors, sebum-secretion accelerators, medicinally-effective ingredients, and perfume bases.

The skin cosmetic compositions according to the present invention can be prepared in accordance with any method known *per se* in the art, and formulated in the desired forms such as emulsions, dispersions, two-layer compositions, solutions, microemulsions and jelly. They may be provides as toilet waters, cosmetic emulsions, creams, essences, packs, foundations, etc.

No particular limitation is imposed on the proportions of the components (A) and (B) in the hair cosmetic compositions according to the present invention so far as the proportions fall within the above ranges. When incorporated in shampoos, their proportions are each preferably about 0.001 to 5%, based

on the total weight of the composition. When incorporated in rinses, treatments, conditioners, and the like, their proportions are each preferably about 0.1 to 20%, based on the total weight of the composition. When incorporated in hair liquids, hair tonics and the like, their proportions are each preferably about 0.01 to 5%, based on the total weight of the composition.

In the hair cosmetic compositions according to the present invention, surfactants may be incorporated when the compositions are provided as shampoos, hair rinses, hair conditioners, hair treatments and the like. Examples of such surfactants include anionic surfactants, amphoteric surfactants, nonionic surfactants and cationic surfactants. As examples of the anionic surfactants and amphoteric surfactants, may be mentioned the same surfactants as those incorporated into the above-described skin cosmetic compositions.

Examples of the nonionic surfactants include polyoxyalkylene alkyl (or alkylene) ethers, polyoxyethylene alkyl phenyl ethers, polyoxypropylene alkyl (or alkylene) ethers, polyoxybutylene alkyl (or alkylene) ethers, nonionic surfactants obtained by adding ethylene oxide and propylene oxide, or ethylene oxide and butylene oxide, higher fatty acid alkanolamides or alkylene oxide adducts thereof, sucrose fatty acid esters, fatty acid monoglycerol esters, and alkylamine oxides.

Examples of the cationic surfactants include mono- or di-long-chain-alkyl quaternary ammonium salts.

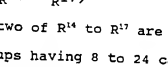
Examples of counter ions to the anionic residues of these surfactants include alkali metal ions such as sodium and potassium, alkaline earth metal ions such as calcium and magnesium, ammonium ion, and alkanolamines having 1 to 3 alkanol groups having 2 or 3 carbon atoms (for example, monoethanolamine, diethanolamine, triethanolamine and triisopropanolamine). Examples of counter ions to the cationic residues include halogen ions such as chlorine, bromine and iodine, and metasulfate and saccharinate ions.

When used in the shampoos and the like, anionic surfactants such as alkyl ether sulfates, alkylsulfates and olefinsulfonates among these surfactants are particularly preferred as principal surfactants. Preferable examples thereof include sodium polyoxyethylene lauryl ether sulfate (average number of moles of ethylene oxide added: 2 to 3), triethanolamine laurylsulfate and sodium α-olefinsulfonate (average number of carbon atoms: 12 to 14).

When used in the shampoos and the like, these surfactants are incorporated in a proportion of 5 to 30%, preferably 10 to 20%, in total, based on the total weight of the composition. When used in the hair rinses, hair treatments, hair conditioners and the like, the nonionic or cationic surfactants are incorporated in a proportion of 0.1 to 50%, preferably 0.5 to 20%, based on the total weight of the composition.

When the hair cosmetic composition is provided as a hair rinse, hair treatment or hair conditioner, long-chain-alkyl quaternary ammonium salts, and oils and fats may be

incorporated with a view toward imparting a more pleasant feel to the hair. Examples of the long-chain-alkyl quaternary ammonium salts include long-chain-alkyl quaternary ammonium salts represented by the following general formula (20):

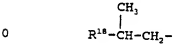


(20)

wherein one or two of R^{14} to R^{17} are linear or branched long-chain alkyl groups having 8 to 24 carbon atoms, the residual R groups are, independently, an alkyl or hydroxyalkyl group having 1 to 3 carbon atoms, or a benzyl group, and X^- is a halogen atom or an alkylsulfate group having 1 to 2 carbon atoms. These ammonium salts may be used either singly or in any combination thereof. Of the long-chain-alkyl quaternary ammonium salts represented by the general formula (20), those, in which the long-chain-alkyl group(s) are branched, are synthesized by using, as a raw material, a branched higher fatty acid or branched higher alcohol in accordance with a method known *per se* in the art. These raw materials may be either natural substances or synthetic products. Examples of the natural raw materials include lanolin fatty acids such as iso-acids and anteisoacids, and terpene alcohols such as farnesol. Examples of the synthetic raw materials include oxo alcohols obtained by using an olefin in accordance with the oxo process, and Guerbet alcohols and 2-alkylalkanols obtained by using an alcohol or an aldehyde as a raw material in accordance with the Guerbet reduction or aldol condensation. In the case of, for example, an oxo alcohol, the branching

rate of the higher alcohol formed is low when the raw material is an α-olefin. When the raw material is an inner olefin, the branching rate becomes higher. In the case of a branched olefin, the branching rate is 100%.

In the branched, long-chain-alkyl quaternary ammonium salts, the branched alkyl group is preferably a 2-methylalkyl group represented by the general formula (21):



(21)

wherein R^{18} is a linear alkyl group having 5 to 13 carbon atoms. Preferable specific examples thereof include 2-methyloctyl, 2-methyldecyl, 2-methylundecyl, 2-methyldodecyl, 2-methyltridecyl, 2-methyltetradecyl and 2-methylheptadecyl. These 2-methylalkyl groups are usually derived from their corresponding oxo alcohols. Such an oxo alcohol is generally obtained as a mixture with a linear alcohol.

Examples of the branched, long-chain-alkyl quaternary ammonium salts having these branched alkyl groups include alkyltrimethylammonium chloride, dialkyldimethylammonium chloride, alkyldimethylbenzylammonium chloride, alkyltrimethylammonium bromide, alkyltrimethylammonium metosulfate and dialkylmethylhydroxymethylammonium chloride. Of these, those having the 2-methylalkyl group(s) represented by the formula (21) are particularly preferred. Examples thereof include branched, mono-long-chain-alkyl quaternary ammonium salts such as 2-methyldecyltrimethylammonium chloride, 2-methyldodecyltrimethylammonium chloride and 2-methyltetradecyltrimethylammonium chloride; branched, di-long-

chain-alkyl quaternary ammonium salts one of the long-chain-alkyl groups of which is branched, such as 2-methyldecylundecyldimethylammonium chloride, 2-methyldodecyltridecyldimethylammonium chloride and 2-methyltetradecylpentadecyldimethylammonium chloride; and branched, di-long-chain-alkyl quaternary ammonium salts both long-chain-alkyl groups of which are branched, such as di(2-methyldecyl)dimethylammonium chloride, di(2-methyldodecyl)-dimethylammonium chloride and di(2-methyltetradecyl)-dimethylammonium chloride.

Examples of the linear long-chain alkyl groups include decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, octadecyl, and eicosanyl groups.

As the oils and fats, there may be used those routinely employed. Examples thereof include liquid paraffin, glycerides, higher alcohols, lanolin derivatives, esters and higher fatty acids. As the glycerides, monoglycerides derived from saturated or unsaturated and linear or branched fatty acids having 12 to 24 carbon atoms are used. Among these oils and fats, higher alcohols having a linear or branched alkyl or alkenyl groups having 12 to 26 carbon atoms are particularly preferred. Preferable specific examples thereof include cetyl alcohol, stearyl alcohol, arachidic alcohol, behenyl alcohol, caranerbil alcohol and ceryl alcohol.

Preferable proportions of these long-chain-alkyl quaternary ammonium salts, and oils and fats to be incorporated are 0.01 to 20% and 0.1 to 30%, respectively, based on the total weight of the composition.

When the hair cosmetic composition is provided as a hair liquid or hair tonic, a nonionic surfactant may be used in combination with the components (A) and (B). Examples of this nonionic surfactant include the same surfactants as those incorporated in the above-described skin cosmetic compositions.

It is preferable to incorporate the nonionic surfactant in a proportion of 0.01 to 20%, particularly 0.1 to 5%, based on the total weight of the composition.

The hair cosmetic compositions according to the present invention can be formulated in the forms of aqueous solutions, ethanolic solutions, emulsions, suspensions, gels, solids, aerosol, powders and the like, and no particular limitation is imposed on the forms thereof. Besides the above components, the same components as those incorporated in the above-described skin cosmetic compositions may be incorporated as cosmetic ingredients as needed.

Other features of the invention will become apparent in the course of the following descriptions of exemplary embodiments which are given for illustration of the invention and are not intended to be limiting thereof.

EXAMPLES

Vegetable extracts of the component (B) were prepared in accordance with the following processes to give a dry solid content of 0.1 to 20%. In the following examples, the vegetable extracts obtained in these Preparation Examples 1-8 were used.

Preparation Example 1: Preparation process of hamamelis extract.

Added to 100 grams of a dry ground product of leaves and bark of hamamelis were 1,000 ml of 50 v/v% aqueous ethanol to conduct extraction for 3 days while sometimes stirring the mixture at room temperature. The resultant extract was filtered, and the filtrate was left at rest for 3 days at 5°C and then filtered again, thereby obtaining a supernatant.

Preparation Example 2: Preparation process of peony extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of root and bark of peony was used in place of the dry ground product of hamamelis.

Preparation Example 3: Preparation process of agrimony extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of the whole of agrimony was used in place of the dry ground product of hamamelis.

Preparation Example 4: Preparation process of Japanese catalpa extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of fruits of Japanese catalpa was used in place of the dry ground product of hamamelis.

Preparation Example 5: Preparation process of hiba arborvitae extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of leaves, bark and root of hiba arborvitae was used in place of the dry ground product of hamamelis.

Preparation Example 6: Preparation process of HORUTOSO extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of seeds or the whole of HORUTOSO was used in place of the dry ground product of hamamelis.

Preparation Example 7: Preparation process of Isodon japonicus Hara extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of the whole of Isodon japonicus Hara was used in place of the dry ground product of hamamelis.

Preparation Example 8: Preparation process of KIJITSU extract.

An extract was prepared in the same manner as in Preparation Example 1 except that a dry ground product of KIJITSU was used in place of the dry ground product of hamamelis.

The evaluation methods as to effects for the improvement of skin roughness in the present invention are described below.

(Testing methods)

Chosen as volunteers in winter were 10 women of 20 to 50 years of age who had skin roughness on their both cheeks. Different external skin-care preparations were applied separately to the left and right cheeks of each volunteer for 2 weeks. On the day following the completion of the two-week application test, tests were conducted with respect to the following properties.

(1) Skin conductance:

After washing the face with warm water of 37°C, each volunteer was allowed to rest for 20 minutes in a room which was air-conditioned at 20°C and 40% humidity. The water content of her horny layer was measured by a skin conductance neter (manufactured by IBS Company). A smaller conductance value indicates greater skin roughness. Conductance values of 5 and smaller indicate severe skin roughness. On the contrary, no substantial skin roughness is observed where this value is 20 or greater.

(2) Score of skin roughness:

Skin roughness was observed visually and ranked in accordance with the following standard shown. Each score was indicated by an average value.

0: No skin roughness was observed;

1: Slight skin roughness was observed;

2: Skin roughness was observed;

3: Rather severe skin roughness was observed;

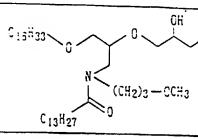
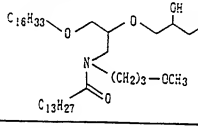
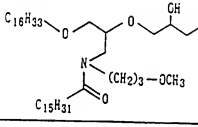
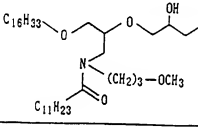
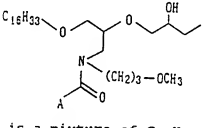
4: Severe skin roughness was observed.

Example 1:

O/W type creams having the following composition were prepared to evaluate their effects for the improvement of skin roughness by continuous application.

The structures of amide derivatives used, and polyhydric alcohols used as well as their proportions incorporated are shown in Tables 1-4, and the evaluation results as to the effects for the improvement of skin roughness are shown in Table 5.

Table 1

1		(10.0), Glycerol (3.0)
2		(10.0), 1,3-Propanediol (3.0)
3		(10.0), Dipropylene glycol (3.0)
4		(10.0), 1,3-Butylene glycol (3.0)
5		(10.0), Polyoxyethylene (20) methylglycoside (3.0)

(A is a mixture of $C_{14}H_{29}$, $C_{16}H_{33}$ and $C_{18}H_{37}$)

Table 2

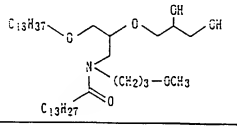
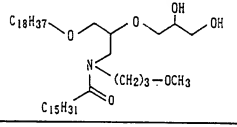
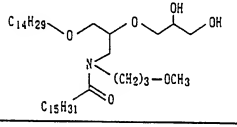
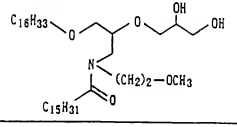
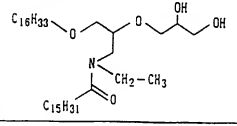
6		(10.0), Propylene glycol (3.0)
7		(10.0), Diglycerol (3.0)
8		(10.0), Maltitol (3.0)
9		(10.0), Sorbitol (3.0)
10		(10.0), Erythritol (3.0)

Table 3

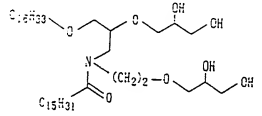
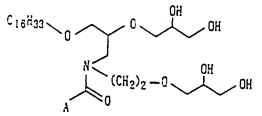
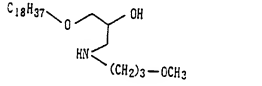
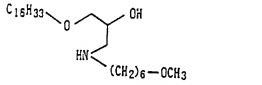
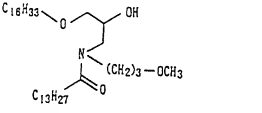
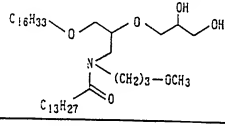
11		(10.0), Glycerol (3.0)
12	 (A is a mixture of $C_{14}H_{29}$, $C_{16}H_{33}$ and $C_{18}H_{37}$)	(10.0), 1,3-Propanediol (3.0)
13		(10.0), Glycerol (3.0)
14		(10.0), 1,3-Propanediol (3.0)
15		(10.0)

Table 3

16	 (10.0)
17	Glycerol (3.0)
18	Glucose (3.0)

Numerals in parentheses mean amounts (%) incorporated.
1-14: Invention products; 15-18: Comparative products.

(Composition)

(%)

(1) Amide derivative (see Table 1-4) See Tables 1-4

(2) Polyhydric alcohol (see Table 1-4) See Tables 1-4

(3)	Citric acid	1.0
(4)	Polyoxyethylene (10) hardened castor oil	1.0
(5)	Sorbitan monostearate	0.5
(6)	Sodium stearoyl methyltaurine	0.5
(7)	Sodium polyoxyethylene lauryl ether phosphate	0.5
(8)	Cholesterol	1.3
(9)	Cetostearyl alcohol	2.0
(10)	Cholesteryl isostearate	1.0
(11)	Squalane	2.0
(12)	Neopentylglycol dicaprate	8.0
(13)	Methylpolysiloxane*1	4.0
(14)	Cyclic silicone*2	4.0
(15)	Antiseptic	q.s.
(16)	Purified water	Balance
(17)	Ethanol	3.0
(18)	Perfume base	q.s.
	Total	100.0

*1: Silicone KF96A (6 cs), product of Shin-Etsu Chemical Co., Ltd.

2*: Silicone SH-244, SH-245 or a 3:2 (by weight) mixture of SH-244 and SH-245, product of Dow Corning Toray Silicone Co., Ltd.

(Preparation process)

The oil-phase components [(1), (4), (5), (7) to (14); the component (2) may be included in the water phase according to the compound] were heated to 80°C to melt them. The water-phase components [(3), (6), (15), (16)], which had been heated to 80°C, were added to the above molten oil-phase components with stirring to emulsify them. The resultant emulsion was then cooled to 50°C with stirring. The components (17) and (18) were then added to the emulsion, and the resultant mixture was further cooled to room temperature with stirring, thereby obtaining an O/W type cream.

Table 5

	No.	Skin conductance	Score of skin roughness
Invention product	1	40 ± 2.7	0.4 ± 0.3
	2	39 ± 5.1	0.5 ± 0.2
	3	35 ± 3.3	0.6 ± 0.2
	4	37 ± 2.2	0.6 ± 0.4
	5	33 ± 4.1	0.4 ± 0.3
	6	30 ± 2.7	0.5 ± 0.3
	7	35 ± 3.8	0.7 ± 0.2
	8	30 ± 2.1	0.4 ± 0.2
	9	30 ± 3.4	0.4 ± 0.2
	10	28 ± 3.8	0.6 ± 0.3
	11	35 ± 4.7	0.5 ± 0.3
	12	38 ± 2.5	0.7 ± 0.3
	13	30 ± 3.4	0.8 ± 0.4
	14	30 ± 4.1	0.9 ± 0.4
Comparative product	15	16 ± 3.4	1.5 ± 0.6
	16	17 ± 4.1	1.4 ± 0.6
	17	10 ± 2.7	2.2 ± 0.8
	18	8 ± 1.9	2.9 ± 0.7

As apparent from Table 5, the compositions according to the present invention, in which the amide derivative (A) and the polyhydric alcohol (B-1) were incorporated, exhibited

excellent water-retaining effects on the horny layer and skin roughness-preventing effects.

Example 2: W/O Type Cream

A W/O type cream having the following composition was prepared.

(Composition)

	(%)
(1) Amide derivative (the same compound as Compound No. 1 in Table 1)	3.5
(2) Citric acid	0.5
(3) Glycerol	1.0
(4) Cholesterol	0.5
(5) Cholesteryl isostearate	0.5
(6) Polyether-modified silicone*3	2.0
(7) Cyclic silicone*4	20.0
(8) Methylphenylpolysiloxane*5	5.0
(9) Magnesium sulfate	0.5
(10) Acid polysaccharide*6	5.0
(11) Purified water	Balance
(12) Antiseptic	q.s.
(13) Perfume base	q.s.
Total	100.0

*3: Silicone KF-6015, product of Shin-Etsu Chemical Co., Ltd.

*4: A 3:2 (by weight) mixture of Silicone SH-244 and SH-245, product of Dow Corning Toray Silicone Co.,

Ltd.

5*: Silicone SF-557, product of Dow Corning Toray Silicone Co., Ltd.

6*: An acid polysaccharide derived from the callus of tuberose prepared in accordance with Example 1 of Japanese Patent Application Laid-open No. 10997/1989.

(Preparation process)

The oil-phase components [(1), (4) to (6), (8)] were heated to 80°C to melt them. The water-phase components [(2), (3), (9) to (12)], which had been heated to 80°C, were added to the above molten oil-phase components with stirring to emulsify them. The resultant emulsion was then cooled to 50°C with stirring. The components (7) and (13) were then added to the emulsion, and the resultant mixture was further cooled to room temperature with stirring, thereby obtaining a W/O type cream.

Example 3: O/W Type moisturizing Lotion

An O/W type moisturizing lotion having the following composition was prepared in accordance with a method known per se in the art.

(Composition)

		(%)
(1)	Amide derivative (the same compound as Compound No. 1 in Table 1)	3.0
(2)	Cholesterol	0.5

(3)	1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.2
(4)	2-(2-Hydroxyethoxy)ethylguanidine*8	0.5
(5)	Cetyl alcohol	1.0
(6)	Vaseline	2.0
(7)	Squalane	5.0
(8)	Dimethylpolysiloxane (6 cSt)	2.0
(9)	Glycerol	4.0
(10)	1,3-Propanediol	2.0
(11)	Polyoxyethylene (20) sorbitan monooleate	0.5
(12)	Sorbitan monostearate	0.3
(13)	Acid polysaccharide*6	5.0
(14)	Cholesteryl mono-n-hexadecenylsuccinate	1.0
(15)	Stearyl glycyrrhetinate	1.0
(16)	Tocopherol	1.0
(17)	Succinic acid	0.55
(18)	Sodium dihydrogenphosphate	0.9
(19)	Carboxyvinyl polymer*9	0.15
(20)	Potassium hydroxide	0.045
(21)	Purified water	Balance
	Total	100.0

*6: An acid polysaccharide derived from the callus of tuberose prepared in accordance with Example 1 of Japanese Patent Application Laid-open No. 10997/1989.

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-open No. 17849/1995,

which is incorporated herein by reference

*8: Prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 170628/1995, which is incorporated herein by reference.

*9: Carbopol 940, product of Goodrich Company.

Example 4: Moisturizing Essence

A moisturizing essence having the following composition was prepared in accordance with a method known *per se* in the art.

(Composition)

	(%)
(1) Acid polysaccharide*6	0.20
(2) Xanthan gum	0.50
(3) Ethanol	6.40
(4) Amide derivative (the same compound as Compound No. 1 in Table 1)	0.10
(5) 1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.20
(6) 2-(2-Hydroxyethoxy)ethylguanidine*8	0.10
(7) Urea	2.50
(8) ε-Aminocapronic acid	0.83
(9) Succinic acid	1.50
(10) Glycerol	12.00
(11) Dipropylene glycol	3.00
(12) Methyl p-oxybenzoate	0.20
(13) Polyoxyethylene isocetyl ether (20 E.O.)	0.30

(14) Tannic acid	0.02
(15) Glycinebetaine	0.50
(16) Antiseptic	0.10
(17) Purified water	Balance
Total	100.0

*6: An acid polysaccharide derived from the callus of tuberose prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 10997/1989.

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-Open No. 17849/1995.

*8: Prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 170628/1995.

All the cosmetic compositions obtained in Examples 1-4 could enhance the water-retaining ability of the horny layer and had excellent effects for the improvement of skin roughness.

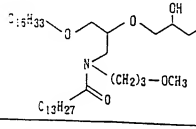
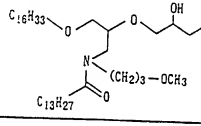
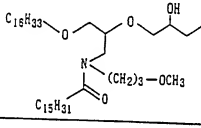
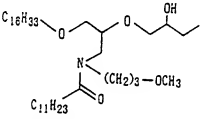
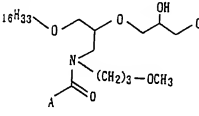
Example 5:

O/W type creams having the following composition were prepared to evaluate their effects for the improvement of skin roughness by continuous application in the same manner as described above.

The structures of amide derivatives used, and organic acids or salts thereof and polyhydric alcohols used as well as their proportions incorporated are shown in Tables 6-9, and

the evaluation results as to the effects for the improvement of skin roughness are shown in Table 10.

Table 6

19		(10.0), Stearic acid (5.0), Glycerol (5.0)
20		(10.0), Palmitic acid (5.0), Glycerol (5.0)
21		(10.0), Lactic acid (3.0), Glycerol (5.0)
22		(10.0), Na lactate (3.0), 1,3-Butylene glycol (5.0)
23		(10.0), Citric acid (3.0), 1,3-Butylene glycol (5.0)

(A is a mixture of $C_{14}H_{29}$, $C_{16}H_{33}$ and $C_{18}H_{37}$)

Table 7

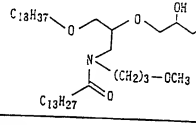
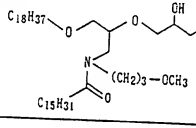
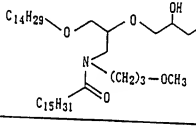
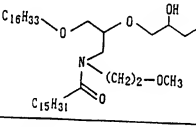
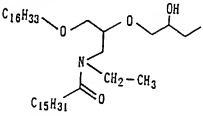
24		(10.0), Na citrate (3.0), 1,3-Butylene glycol (5.0)
25		(10.0), Glycolic acid (3.0), Sorbit (5.0)
26		(10.0), Succinic acid (3.0), Sorbit (5.0)
27		(5.0), aspartic acid (3.0), Sorbit (3.0)
28		(5.0), Sterol derivative*10 (3.0), Dipropylene glycol (5.0)

Table 8

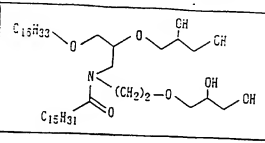
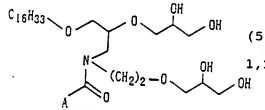
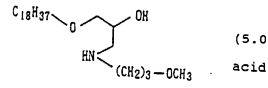
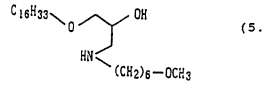
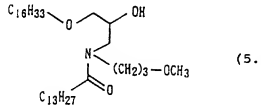
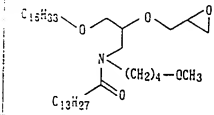
29		(5.0), 2-Hydroxyoctanoic acid (3.0), Polyoxyethylene methylglucoside (5.0)
30	 (A is a mixture of $C_{14}H_{29}$, $C_{16}H_{33}$ and $C_{18}H_{37}$)	(5.0), Linolic acid (3.0), 1,3-Propylene glycol (5.0)
31		(5.0), γ-Aminobutyric acid (3.0)
32		(5.0), Na glutamate (3.0)
33		(5.0), Glycerol (1.0)

Table 9

34	 (5.0), Glycerol (1.0)
35	Stearic acid (3.0)
36	Citric acid (3.0)

Numerals in parentheses mean amounts (%) incorporated.

19-32: Invention products; 33-36: Comparative products.

*10: A compound of the general formula (5) in which l is 2, and R^2 is cholesteryl.

(Composition)

		(%)
(1)	Amide derivative (see Table 6-9)	See Tables 6-9
(2)	Organic acid or a salt thereof (see Table 6-9)	See Tables 6-9
(3)	Polyhydric alcohol (see Table 6-9)	See Tables 6-9
(4)	Polyoxyethylene (10) hardened castor oil	1.0
(5)	Sorbitan monostearate	0.5
(6)	Sodium stearoyl methyltaurine	0.5
(7)	Sodium polyoxyethylene lauryl ether	0.5

phosphate	
(8) Cholesterol	1.3
(9) Cetostearyl alcohol	2.0
(10) Cholesteryl isostearate	1.0
(11) Squalane	2.0
(12) Neopentylglycol dicaprate	8.0
(13) Methylpolysiloxane*1	4.0
(14) Cyclic silicone*2	4.0
(15) Antiseptic	q.s.
(16) Purified water	Balance
(17) Ethanol	3.0
(18) Perfume base	q.s.
Total	100.0

*1: Silicone KF96A (6 cs), product of Shin-Etsu Chemical Co., Ltd.

*2: Silicone SH-244, SH-245 or a 3:2 (by weight) mixture of SH-244 and SH-245, product of Dow Corning Toray Silicone Co., Ltd.

(Preparation process)

The oil-phase components [(1), (4), (5), (7) to (14); the component (2) may be included in the water phase according to the compound] were heated to 80°C to melt them. The water-phase components [(3), (6), (15), (16)], which had been heated to 80°C, were added to the above molten oil-phase components with stirring to emulsify them. The resultant emulsion was then cooled to 50°C with stirring. The components (17) and

(18) were then added to the emulsion, and the resultant mixture was further cooled to room temperature with stirring, thereby obtaining an O/W type cream.

Table 10

	No.	Skin conductance	Score of skin roughness
Invention product	19	44 ± 5.2	0.4 ± 0.2
	20	33 ± 4.7	0.6 ± 0.3
	21	37 ± 2.3	0.7 ± 0.4
	22	28 ± 3.0	0.7 ± 0.3
	23	40 ± 3.7	0.5 ± 0.3
	24	35 ± 2.5	0.6 ± 0.2
	25	29 ± 2.4	0.7 ± 0.4
	26	36 ± 2.9	0.4 ± 0.3
	27	41 ± 4.0	0.4 ± 0.2
	28	29 ± 5.4	0.6 ± 0.3
	29	45 ± 3.6	0.4 ± 0.2
	30	38 ± 4.1	0.5 ± 0.3
	31	26 ± 3.0	0.9 ± 0.4
	32	25 ± 2.8	0.8 ± 0.3
Comparative product	33	19 ± 3.5	1.4 ± 0.5
	34	15 ± 2.3	1.3 ± 0.6
	35	8 ± 1.2	2.5 ± 0.8
	36	10 ± 1.9	3.0 ± 0.5

Example 6:

A W/O type cream having the following composition was prepared. This cream had excellent effects in improving the water-retaining ability of the horny layer, and preventing and curing skin roughness.

(Composition)

		(%)
(1)	Amide derivative (the same compound as Compound No. 19 in Table 6)	3.5
(2)	Citric acid	0.5
(3)	Glycerol	1.0
(4)	Cholesterol	0.5
(5)	Cholesteryl isostearate*3	0.5
(6)	Polyether-modified silicone	2.0
(7)	Cyclic silicone*4	20.0
(8)	Methylphenylpolysiloxane*5	5.0
(9)	Magnesium sulfate	0.5
(10)	Purified water	Balance
(11)	Antiseptic	q.s.
(12)	Perfume base	q.s.
	Total	100.0

*3: Silicone KF-6015, product of Shin-Etsu Chemical Co., Ltd.

*4: A 3:2 (by weight) mixture of Silicone SH-244 and SH-245, product of Dow Corning Toray Silicone Co., Ltd.

*5: Silicone SF-557, product of Dow Corning Toray Silicone Co., Ltd.

(Preparation process)

The oil-phase components [(1), (4) to (6), (8)] were heated to 80°C to melt them. The water-phase components [(2), (3), (9) to (11)], which had been heated to 80°C, were added to the above molten oil-phase components with stirring to emulsify them. The resultant emulsion was then cooled to 50°C with stirring. The components (7) and (12) were then added to the emulsion, and the resultant mixture was further cooled to room temperature with stirring, thereby obtaining a W/O type cream.

Example 7:

A hair tonic having the following composition was prepared. This hair tonic could improve the water-retaining ability of the horny layer, protect the hair and head skin and gave a pleasant feel to the hair.

(Composition)

		(%)
(1)	Amide derivative (the same compound as Compound No. 19 in Table 6)	1.0
(2)	Sterol derivative*10	1.0
(3)	1,3-Butylene glycol	3.0
(4)	Aluminum pyrrolidonecarboxylate	0.5
(5)	Ethanol	55.0
(6)	Purified water	Balance
(7)	Perfume base	q.s.
	Total	100.0

*10: A compound of the general formula (5) in which l is 2, and R^2 is cholesteryl.

(Preparation process)

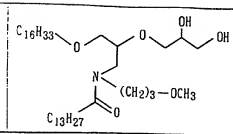
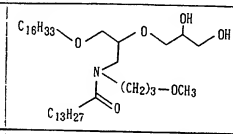
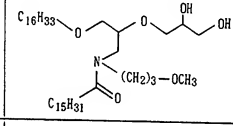
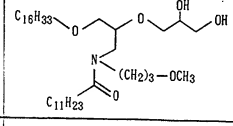
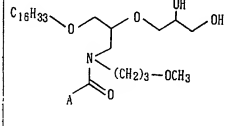
The components (1) and (2) were uniformly dispersed in the component (6) under stirring. The components (3), (4), (5) and (7) were then added to the resultant dispersion, and the mixture was thoroughly stirred to prepare a hair tonic.

Example 8:

O/W type creams having the following composition were prepared to evaluate their effects for the prevention of the formation of wrinkles upon their use by the following method.

The structures of amide derivatives used and incorporated components such as vegetable extracts (those obtained in Preparation Examples 1-8) as well as their proportions (%) incorporated are shown in Tables 11-14 (37 to 50: invention products; 51-54: comparative products), and the evaluation results as to the effects for the prevention of formation of wrinkles are shown in Table 15.

Table 11

37		(10.0), Hamamelis extract (dry solid 1.5%) (1.0), Acid polysaccharide*6 (1.0)
38		(10.0), Hiba arborvitae extract (dry solid 1.5%) (1.0), Cholesteryl isostearate (1.0)
39		(10.0), Agrimony extract (dry solid 1.0%) (1.0), Stearyl glycyrrhetinate (0.1)
40		(10.0), Japanese catalpa extract (dry solid 1.0%) (1.0), Tocopherol (0.1)
41		(10.0), Peony extract (dry solid 1.0%) (1.0), Cholesterol (1.0)

(A is a mixture of $C_{14}H_{29}$, $C_{16}H_{33}$ and $C_{18}H_{37}$)

*6: An acid polysaccharide derived from the callus of tuberose prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 10997/1989.

Table 12

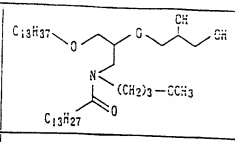
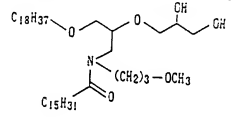
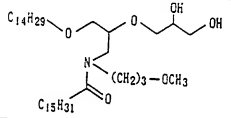
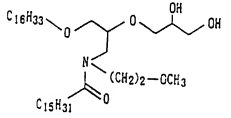
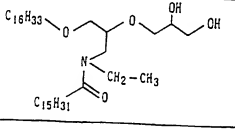
42		(10.0), HORUTOSO extract (dry solid 1.0%) (1.0), ε-Aminocarponic acid (5.0)
43		(10.0), KIJITSU extract (dry solid 1.0%) (1.0), Tannic acid (0.1)
44		(10.0), Isodon japonicus Hara extract (dry solid 1.5%) (1.0), Cholesteryl alkenylsuccinate (1.0)
45		(10.0), Hamamelis extract (dry solid 1.5%) (1.0), Glycyrrhetinic acid (0.1)
46		(10.0), Peony extract (dry solid 1.0%) (1.0), Ascorbic acid (0.1)

Table 13

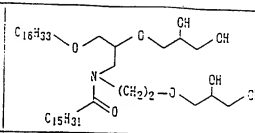
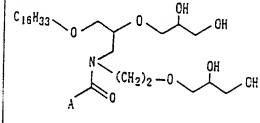
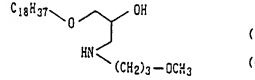
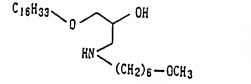
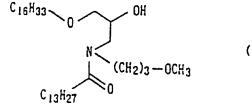
47		(10.0), Agrimony extract (dry solid 1.0%) (1.0), Carotene (0.1)
48	 (A is a mixture of $C_{14}H_{29}$, $C_{16}H_{33}$ and $C_{18}H_{37}$)	(10.0), Japanese catalpa extract (dry solid 1.0%) (1.0), Cholesteryl isostearate (1.0)
49		(10.0), Hamamelis extract (dry solid 1.5%) (3.0)
50		(10.0), Isodon japonicus Hara extract (dry solid 1.5%) (1.0)
51		(10.0)

Table 14

52	Hiba arborvitae extract (dry solid 1.5%) (1.0)
53	Cholesterol (1.0)
54	Glycyrrhetinic acid (0.1)
55	Carotene (0.1)

(Composition)

		(%)
(1)	Amide derivative (see Table 11-14)	See Tables 11-14
(2)	Vegetable extract, etc. (see Table 11-14)	See Tables 11-14
(3)	Glycerol	1.0
(4)	Polyoxyethylene (10) hardened castor oil	1.0
(5)	Sorbitan monostearate	0.5
(6)	Sodium stearoyl methyltaurine	0.5
(7)	Sodium polyoxyethylene lauryl ether phosphate	0.5
(8)	Cetostearyl alcohol	2.0
(9)	Squalane	2.0
(10)	Neopentylglycol dicaprate	8.0
(11)	Methylpolysiloxane*1	4.0
(12)	Cyclic silicone*2	4.0
(13)	Antiseptic	q.s.
(14)	Purified water	Balance
(15)	Ethanol	3.0
(16)	Perfume base	q.s.
	Total	100.0

*1: Silicone KF96A (6 cs), product of Shin-Etsu Chemical Co., Ltd.

*2: Silicone SH-244, SH-245 or a 3:2 (by weight) mixture of SH-244 and SH-245, product of Dow Corning Toray Silicone Co., Ltd.

(Preparation process)

The oil-phase components [(1), (4), (5), (7) to (11)] were heated to 80°C to melt them. The water-phase components [(3), (6), (13), (14)], which had been heated to 80°C, were added to the above molten oil-phase components with stirring to emulsify them. The resultant emulsion was then cooled to 50°C with stirring. The components (2), (12), (15) and (16) were then added to the emulsion, and the resultant mixture was further cooled to room temperature with stirring, thereby obtaining an O/W type cream.

(Evaluation method)

A cosmetic emulsion (80 μl) was applied to hairless mice. After two hours, the mice were exposed to UV-B (1 MED or less), and just after the exposure, each of the test samples was applied. This process was conducted 3 times a week over 16 weeks. The amount of dosed energy was measured by means of a UV-Radiometer, UVR-305/365D (manufactured by TOKYO OPTICAL K.K.). The total dose was determined to be 100 mJ/cm^2 in an amount of energy of 0.28 mW/cm^2 so as to give a dose of 1 MED or less per exposure.

After completion of the application/exposure for 16 weeks, the degree of wrinkles formed was visually observed to

rank the samples in accordance with the following standard (wrinkle index).

Standard (wrinkle index)

1: No wrinkle was formed;

2: Wrinkles were scarcely formed;

3: Wrinkles were somewhat formed;

4: Wrinkles were formed to a great extent.

Table 15

		Wrinkle index
Invention product	37	0.7
	38	0.8
	39	0.7
	40	0.7
	41	0.8
	42	0.8
	43	0.8
	44	0.7
	45	0.8
	46	0.8
	47	0.7
	48	0.7
	49	1.0
	50	1.0
Comparative product	51	1.8
	52	2.0
	53	2.8
	54	2.8

Example 9: O/W Type Moisturizing Lotion

An O/W type moisturizing lotion having the following composition was prepared in accordance with a method known per se in the art. The thus-obtained cosmetic emulsion had excellent effects for preventing the formation of wrinkles.

(Composition)

(%)

(1)	Amide derivative (the same compound as Compound No. 37 in Table 11)	3.0
(2)	Hamamelis extract (dry solid 1.5%)	0.5
(3)	Peony extract (dry solid 1.0%)	0.5
(4)	Cetyl alcohol	1.0
(5)	Vaseline	2.0
(6)	Squalane	5.0
(7)	Dimethylpolysiloxane (6 cSt)	2.0
(8)	Glycerol	4.0
(9)	1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.5
(10)	2-(2-Hydroxyethoxy)ethylguanidine*8	1.0
(11)	1,3-Butanediol	2.0
(12)	Polyoxyethylene (20) sorbitan monooleate	0.5
(13)	Sorbitan monostearate	0.3
(14)	Acid polysaccharide (the same compound as that used in Example 8)	1.0
(15)	Cholesteryl mono-n-hexadecenylsuccinate	1.0
(16)	Stearyl glycyrrhetinate	1.0
(17)	Tocopherol	1.0
(18)	Succinic acid	0.55
(19)	Sodium dihydrogenphosphate	0.9
(20)	Purified water	Balance
	Total	100.0

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-open No. 17849/1995.

*8: Prepared in accordance with Example 1 of Japanese

Patent Application Laid-Open No. 170628/1995.

Example 10: Sunscreen Lotion

A sunscreen lotion having the following composition was prepared in accordance with a method known per se in the art. The thus-obtained cosmetic emulsion had excellent effects for preventing the formation of wrinkles.

(Composition)

	(%)
(1) Amide derivative (the same compound as Compound No. 37 in Table 11)	2.0
(2) Hamamelis extract (dry solid 1.5%)	0.5
(3) Hiba arborvitae extract (dry solid 1.5%)	0.5
(4) Octyl p-methoxycinnamate	6.0
(5) 4-tert-Butyl-4-methoxybenzoylmethane	2.0
(6) Oleyl oleate	5.0
(7) Dimethylpolysiloxane (6 cSt)	3.0
(8) Vaseline	0.5
(9) Cetyl alcohol	1.0
(10) Sorbitan sesquoleate	0.8
(11) Polyoxyethylene (20) oleyl alcohol ether	1.2
(12) 1-(2-Hydroxyethylamino)-3-(12-hydroxy-stearyloxy)-2-propanol	0.4
(13) 5-Hydroxypentylguanidine	0.8
(14) Dipropylene glycol	6.0
(15) Acid polysaccharide (the same compound as that used in Example 8)	1.0
(16) Ethanol	3.0
(17) Hydroxyethylcellulose	0.3

(18)	Cholesteryl mono-n-octadecenyl succinate	1.0
(19)	Stearyl glycyrrhetinate	1.0
(20)	Tocopherol	1.0
(21)	Succinic acid	0.2
(22)	Sodium hydroxide	0.2
(23)	Purified water	Balance
	Total	100.0

Example 11: Sunscreen Cream

A sunscreen cream having the following composition was prepared in accordance with a method known per se in the art. The thus-obtained cosmetic emulsion had excellent effects for preventing dermal aging.

(Composition)

		(%)
(1)	Amide derivative (the same compound as Compound No. 37 in Table 11)	3.0
(2)	Zinc oxide coated with silicone	7.0
(3)	2-Ethylhexyl p-methoxycinnamate	2.0
(4)	Ascorbic acid	0.5
(5)	Cholesterol	1.0
(6)	Polyether-modified silicone*3	2.5
(7)	Methylpolysiloxane*1	6.0
(8)	Cyclic silicone*2	12.0
(9)	Magnesium sulfate	0.7
(10)	Acid polysaccharide (the same compound	1.0

as that used in Example 8)	
(11) Allantoin	0.1
(12) 1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.1
(13) 1-(2-Hydroxyethylamino)-3-methyloxy-2-propanol	0.5
(14) 2-(2-Hydroxyethoxy)ethylguanidine*8	0.5
(15) 2-Guadinoethyl dihydrogenphosphate	1.0
(16) Hamamelis extract (dry solid 1.5%)	0.5
(17) Hiba arborvitae extract (dry solid 1.5%)	0.5
(18) Glycerol	3.0
(19) Antiseptic	q.s.
(20) Purified water	Balance
Total	100.0

*1: Silicone KF96A (6 cs), product of Shin-Etsu Chemical Co., Ltd.

*2: Silicone SH-244, SH-245 or a 3:2 (by weight) mixture of SH-244 and SH-245, product of Dow Corning Toray Silicone Co., Ltd.

*3: Silicone KF-6015, product of Shin-Etsu Chemical Co., Ltd.

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-Open No. 17849/1995.

*8: Prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 170628/1995.

Example 12: Hair Tonic Composition

(Composition)

		(%)
(1)	Amide derivative (the same compound as Compound No. 37 in Table 11)	1.0
(2)	Aluminum pyrrolidonecarboxylate	0.5
(3)	Ethanol	55.0
(4)	Hiba arborvitae extract (dry solid 1.0%)	1.0
(5)	Hamamelis extract (dry solid 1.0%)	0.2
(6)	Peony extract (dry solid 1.0%)	0.2
(7)	1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.2
(8)	2-(2-Hydroxyethoxy)ethylguanidine*8	1.0
(9)	Purified water	Balance
(10)	Perfume base	0.3
	Total	100.0

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-Open No. 17849/1995.

*8: Prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 170628/1995.

(Preparation process)

The components (1), (7) and (10) were uniformly dispersed in the component (3) under stirring. The components (2), (4) to (6), (8) and (9) were then added to the resultant

dispersion, and the mixture was thoroughly stirred to prepare a suspension type hair tonic composition which had excellent retention of hairstyle set and hairstyle-setting ability, gave a pleasant feel to the hair and prevented the generation of dandruff.

Example 13: Shampoo Composition

(Composition)

		(%)
(1)	Sodium polyoxyethylene (25) lauryl ether phosphate	15.0
(2)	Coconut oil fatty acid diethanolamide	3.0
(3)	Amide derivative (the same compound as Compound No. 37 in Table 11)	2.0
(4)	Alkyl polyglycoside*11	3.5
(5)	Hiba arborvitae extract (dry solid 1.0%)	1.0
(6)	Hamamelis extract (dry solid 1.0%)	0.5
(7)	Peony extract (dry solid 1.0%)	0.7
(8)	1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.2
(9)	2-(2-Hydroxyethoxy)ethylguanidine*8	0.5
(10)	Glycerol	3.0
(11)	Citric acid	0.5
(12)	Ethanol	5.0
(13)	Coloring matter	Trace amount
(14)	Perfume base	0.5
(15)	Purified water	Balance

Total 100.0

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-Open No. 17849/1995.

*8: Prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 170628/1995.

*11: Dodecyl glycoside (polymerization degree of glycoside: 2)

(Preparation process)

The components (3), (8) and (14) were uniformly dissolved in the component (12) at room temperature under stirring. The components (1), (2) and (15) were then added to the resultant solution and uniformly dispersed. Thereafter, the component (4) to (7), (9) to (11) and (13) were incorporated, thereby obtaining a shampoo composition which gave a pleasant feel to the hair and was uniform and stable.

Example 14: Moisturizing Essence

A moisturizing essence having the following composition was prepared in accordance with a method known *per se* in the art.

(Composition)

		(%)
(1)	Acid polysaccharide*6	0.20
(2)	Xanthan gum	0.50
(3)	Ethanol	6.40
(4)	Amide derivative (the same compound as Compound No. 37 in Table 11)	0.10

(5)	1-(2-Hydroxyethylamino)-3-isostearyloxy-2-propanol*7	0.20
(6)	2-(2-Hydroxyethoxy)ethylguanidine*8	0.10
(7)	Hamamelis extract (dry solid 1.5%)	0.50
(8)	Hiba arborvitae extract (dry solid 1.5%)	0.50
(9)	Urea	2.50
(10)	ε-Aminocapronic acid	0.83
(11)	succinic acid	1.50
(12)	Glycerol	12.00
(13)	Dipropylene glycol	3.00
(14)	Methyl p-oxybenzoate	0.20
(15)	Polyoxyethylene isocetyl ether (20 E.O.)	0.30
(16)	Tannic acid	0.02
(17)	Glycinebetaine	0.50
(18)	Antiseptic	0.10
(19)	Purified water	Balance
	Total	100.0

*6: An acid polysaccharide derived from the callus of tuberose prepared in accordance with Example 1 of Japanese Patent Application Laid-Open No. 10997/1989.

*7: Prepared in accordance with Synthetic Example 3 of Japanese Patent Application Laid-open No. 17849/1995.

*8: Prepared in accordance with Example 1 of Japanese

Patent Application Laid-Open No. 170628/1995.

INDUSTRIAL APPLICABILITY

The skin cosmetic compositions according to the present invention exhibit excellent water-retaining ability, and can prevent and cure skin roughness or inflammation to prevent dermal aging. The hair cosmetic compositions according to the present invention have excellent performance in protecting and maintaining the hair and head skin, and improve the feel of the hair.

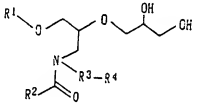
This application is based on Japanese Patent Applications Nos. 7-267422, 7-327224 and 8-013917 filed on October 16, 1995, December 15, 1995 and January 30, 1996 which is incorporated herein by reference in its entirety.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

Claims

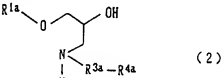
1. A cosmetic composition comprising the following components (A) and (B):

(A) at least one compound selected from amide derivatives represented by the following general formulae (1), (2), (3), and (4):



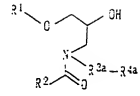
(1)

wherein R^1 and R^2 are identical to or different from each other and are, independently, a hydrocarbon group having 1 to 40 carbon atoms, which may be hydroxylated, R^3 is a linear or branched alkylene group having 1 to 6 carbon atoms, or a single bond, and R^4 is a hydrogen atom, a linear or branched alkoxyl group having 1 to 12 carbon atoms, or a 2,3-dihydroxypropyloxy group, with the proviso that when R^3 is a single bond, R^4 is a hydrogen atom;



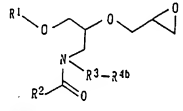
(2)

wherein R^{1a} is a hydrocarbon group having 4 to 40 carbon atoms, which may be hydroxylated, R^{3a} is a linear or branched alkylene group having 3 to 6 carbon atoms, and R^{4a} is a linear or branched alkoxyl group having 1 to 12 carbon atoms;



(3)

wherein R^1 and R^2 are identical to or different from each other and are, independently, a hydrocarbon group having 1 to 40 carbon atoms, which may be hydroxylated, R^{3a} is a linear or branched alkylene group having 3 to 6 carbon atoms, and R^{4a} is a linear or branched alkoxyl group having 1 to 12 carbon atoms;



(4)

wherein R^1 and R^2 are identical with or different from each other and are, independently, a hydrocarbon group having 1 to 40 carbon atoms, which may be hydroxylated, R^3 is a linear or branched alkylene group having 1 to 6 carbon atoms, or a single bond, and R^{4b} is a hydrogen atom, a linear or branched alkoxyl group having 1 to 12 carbon atoms, or an 2,3--epoxypropyloxy group, with the proviso that when R^3 is a single bond, R^{4b} is a hydrogen atom; and

(B) at least one component selected from the group consisting of (B-1) polyhydric alcohols, (B-2) vegetable extracts, and (B-3) organic acids or salts thereof.

2. The composition according to Claim 1, wherein the component (B) comprises at least one polyhydric alcohol (B-1) and at least one organic acid or a salt thereof (B-3).

3. The composition according to Claim 1, which further comprises (C) an acid hetero-polysaccharide derived from callus of a plant belonging to Polyanthes L.

4. The composition according to Claim 1, which further comprises (D) a sterol.

5. The composition according to Claim 1, which further comprises (E) an antiphlogistic substance.

6. The composition according to Claim 1, which further comprises (F) at least one ingredient selected from the group consisting of singlet oxygen scavengers and antioxidants

7. The composition according to Claim 1, which further comprises (G) at least one ingredient selected from the group consisting of amine derivatives and acid-addition salts thereof.

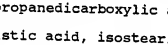
8. The composition according to Claim 1, which further comprises (H) at least one ingredient selected from the group consisting of guanidine derivatives and acid-addition salts thereof.

9. The composition according to Claim 1, wherein said polyhydric alcohol (B-1) is selected from the group consisting of glycerol, diglycerol, triglycerol, tetraglycerol, ethylene glycol, 1,3-butylene glycol, 1,4-butylene glycol, propylene glycol, dipropylene glycol, polyethylene glycol, 1,3-propanediol, glucose, mantose, maltitol, sucrose, fructose, xylitol, sorbitol, maltotriose, threitol, erythritol, alcohols

obtained by reduction of amylolytic sugar, sorbit and polyoxyalkylene alkylglucosides.

10. The composition according to Claim 1, wherein said vegetable extract (B-2) is composed of a vegetable extract from at least one plant selected from the group consisting of hamamelis, peony, agrimony, Japanese catalpa, hiba arborvitae, HORUTOSO, Isodon japonicus Hara and KIJITSU.

11. The composition according to Claim 1, wherein said organic acid (B-3) is selected from the group consisting of glycolic acid, lactic acid, citric acid, 2-hydroxyoctanoic acid, succinic acid, fumaric acid, maleic acid, malonic acid, 1,3propanedicarboxylic acid, stearic acid, paimitic acid, myristic acid, isostearic acid, linolic acid, linolenic acid, arachidonic acid, aspartic acid, asparagine, glycine, glutamic acid, glutamine, γ-aminobutyric acid, arginine, cysteine, alanine, dicarboxylic acid monoesters, and sterol derivatives represented by the general formula (5):



(5)

wherein R^X is $-(CH_2)_l-$ (l is a number of 2 to 10), $-CH_2-CH-$ or $-CH-CH_2-$ (R^Y is a linear or branched alkyl or alkenyl group having 6 to 20 carbon atoms), and R^Z is a residue of a natural sterol or a hydrogenated product thereof in which a proton of the hydroxyl group is removed.

12. The composition according to Claim 1, wherein the content of the component (A), the amide derivative, is 0.001 to 50 wt.%, based on the total weight of said composition.

13. The composition according to Claim 1, wherein the content of the component (B-1), the polyhydric alcohol, is 0.01 to 50 wt.%, the content of the component (B-2), the vegetable extract, is 0.0001 to 20 wt.% in terms of dry solids, and the content of the component (B-3), the organic acid or the salt thereof, is 0.00001 to 30 wt.%, all based on the total weight of said composition

14. The composition according to Claim 3, wherein said component (C) is composed of an acid heteropolysaccharide derived from callus of tuberose, and is present in an amount of 0.0001 to 20 wt.%, based on the total weight of said composition.

15. The composition according to Claim 4, wherein said component (D), the sterol, is selected from the group consisting of cholesteryl alkenylsuccinates, cholesterol and cholesteryl isostearate, and is present in an amount of 0.01 to 50 wt.%, based on the total weight of said composition.

16. The composition according to Claim 5, wherein said component (E), the antiphlogistic substance, is selected from the group consisting of glycyrrhetinic acid, stearyl glycyrrhetinate and ϵ-aminocapronic acid, and is present in an amount of 0.001 to 5 wt.%, based on the total weight of said composition.

17. The composition according to Claim 6, wherein said component (F), the singlet oxygen scavenger or antioxidant, is

selected from the group consisting of carotenes, tocopherols, ascorbic acid, tannic acid, epicatechin gallate, and epicarocatechin gallate, and is present in an amount of 0.001 to 5 wt.%, based on the total weight of said composition.

18. The composition according to Claim 7, wherein said component (G), the amine derivative or the acid-addition salt thereof, is selected from the group consisting of 1-(2-hydroxyethylamino)-3-isostearyloxy-2-propanol, 1-(2-hydroxyethylamino)3-(12-hydroxystearyloxy)-2-propanol and 1-(2-hydroxyethylamino)-3-methyloxy-2-propanol, and is present in an amount of 0.0001 to 10 wt.%, based on the total weight of said composition.

19. The composition according to Claim 8, wherein said component (H), the guanidine derivative or the acid-addition salt thereof, is selected from the group consisting of 2-(2-hydroxyethoxy)ethylguanidine, 5-hydroxypentylguanidine, 3-guanidinopropionic acid and 2-guanidinoethyl dihydrogenphosphate, and is present in am amount of 0.001 to 50 wt.%, based on the total weight of said composition.

20. The composition according to Claim 1, which is a skin cosmetic composition.

21. The composition according to Claim 1, which is a hair cosmetic composition.

INTERNATIONAL SEARCH REPORT

Inte. nal Application No
PCT/JP 96/02982

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/48 A61K7/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 93 05763 A (KAO) 1 April 1993 see claim 1	1,20
A	EP 0 282 816 A (KAO) 21 September 1988 cited in the application see claim 1	1,20
A	WO 94 23694 A (UNILEVER) 27 October 1994 see claim 1	1,20
A	FR 2 358 138 A (HENKEL) 10 February 1978 see claim 1	1,20
A	DE 43 26 959 A (HENKEL) 16 February 1995 see claim 1	1,20

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
6 February 1997	14. 02. 97

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+ 31-70) 340-3016	Voyiazoglou, D

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INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/JP 96/02982

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CHEMICAL ABSTRACTS, vol. 122, no. 19, 8 May 1995 Columbus, Ohio, US; abstract no. 236134k, G. IMOKAWA ET AL: "Pseudo-acylceramide with linoleic acid produces selective recovery of diminished cutaneous barrier function in essential fatty acid-deficient rats and has an inhibitory effect on epidermal hyperplasia" page 685; XP002024670 see abstract & J. CLIN. INVEST., vol. 94, no. 1, 1994, pages 89-96, ---	1,20
A	DATABASE WPI Week 8838 Derwent Publications Ltd., London, GB; AN 88-266512 XP002024529 "Compsn. for external skin application - contains ceramide cpd. as cholesterol, cholesterol fatty acid, triglyceride, phospholipid etc" & JP 63 192 703 A (KAO) , 10 August 1988 see abstract ---	1,20
P,A	DE 195 39 016 A (KAO) 25 April 1996 see claim 1 ---	1,20
P,A	DATABASE WPI Week 9632 Derwent Publications Ltd., London, GB; AN 96-318813 XP002024530 "Safe skin cosmetics, esp. for oily skin with rashes - comprise alkyl substd. carboxylic acids and amide derivs." & JP 08 143 417 A (KAO) , 4 June 1996 see abstract -----	1,20

4

INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/JP 96/02982

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9305763	01-04-93	DE-D- 69209513	02-05-96
		DE-T- 69209513	12-09-96
		EP-A- 0605543	13-07-94
		JP-A- 5194185	03-08-93
		US-A- 5552445	03-09-96
		JP-A- 6040885	15-02-94
EP-A-282816	21-09-88	JP-B- 6092293	16-11-94
		JP-A- 63216812	09-09-88
		JP-B- 6092294	16-11-94
		JP-A- 63218609	12-09-88
		JP-B- 6092295	16-11-94
		JP-A- 63222107	16-09-88
		JP-B- 6092296	16-11-94
		JP-A- 63227513	21-09-88
		JP-B- 6092297	16-11-94
		JP-A- 63227514	21-09-88
		JP-B- 6092298	16-11-94
		JP-A- 63297309	05-12-88
		JP-A- 1009905	13-01-89
		JP-B- 6069930	07-09-94
		JP-A- 1009906	13-01-89
		JP-B- 6069931	07-09-94
		JP-A- 1009907	13-01-89
		JP-B- 6069932	07-09-94
		DE-D- 3854275	07-09-95
		DE-T- 3854275	11-04-96
		DE-D- 3884021	21-10-93
		DE-T- 3884021	14-04-94
		EP-A- 0534286	31-03-93
		ES-T- 2077948	01-12-95
		US-A- 4985547	15-01-91
		US-A- 5028416	02-07-91
		US-A- 5071971	10-12-91
		JP-A- 1079195	24-03-89
WO-A-9423694	27-10-94	AU-A- 6677494	08-11-94
		CA-A- 2159201	27-10-94
		EP-A- 0695167	07-02-96
		JP-T- 8508742	17-09-96

INTERNATIONAL SEARCH REPORT

Int. ..onal Application No
PCT/JP 96/02982

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9423694		US-A- 5578641	26-11-96
		ZA-A- 9402678	19-10-95
FR-A-2358138	10-02-78	DE-A- 2631284	26-01-78
		AT-B- 350731	11-06-79
		BE-A- 856683	11-01-78
		GB-A- 1525449	20-09-78
		JP-A- 53038637	08-04-78
		NL-A- 7706844	16-01-78
		US-A- 4143159	06-03-79
DE-A-4326959	16-02-95	WO-A- 9505152	23-02-95
		EP-A- 0713384	29-05-96
DE-A-19539016	25-04-96	JP-A- 8119847	14-05-96

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(54) Title: THE USE OF PLANT EXTRACTS AND SUGARS TO PROTECT KERATINOUS TISSUE

(57) Abstract: The present invention provides a composition for the treatment or protection of keratinous tissue, the composition comprising at least one plant extract and at least one sugar present in a combined amount synergistically effective to protect keratinous tissues from extrinsic damage. In another embodiment, the present invention is drawn to a method of protecting keratinous tissue from extrinsic damage, e.g., protein loss caused by exposure to heat, chemicals, etc. The present invention also contemplates a method of improving combability and/or a method of improving curl formation of keratinous fibers.

THE USE OF PLANT EXTRACTS AND SUGARS TO PROTECT KERATINOUS TISSUE

The present invention is directed to a composition for use on keratinous tissues and to methods of treating keratinous tissues with the composition in order to provide protection from extrinsic damage and to provide improved styling properties and other qualities. For example, the inventive composition can provide protection to hair while improving combability and curl formation. More particularly, the present invention is directed to a composition comprising plant extracts and sugars in a combined amount synergistically effective to provide protection benefits to keratinous tissues, including skin, hair, eyelashes, eyebrows and nails.

Keratinous tissues, especially hair and skin, are constantly exposed to harsh extrinsic conditions such as sun, chemical damage, *e.g.*, from detergents, bleaching, relaxing, dyeing, and permanent waving, and heat, e.g., from hair dryers or curlers. These external factors generally result in damage to the keratinous tissues. There is a need, therefore, for cosmetic products that are useful in restoring and protecting keratinous tissues from such harsh extrinsic conditions.

In this age of the immense popularity of "natural" based consumer products, specific groups of plant extracts have been identified for their "healing" or protecting properties with regard to keratinous tissue. In particular, plant extracts have been used in numerous skin care compositions such as: compositions containing carrot, tomato, tobacco, bean or potato extracts for the repair of sun damaged skin (U.S. Patent No. 5,547,997); compositions containing actzuki bean, catechu, or avocado extracts for preventing and improving multiple skin conditions (European Patent EP965328 A1); compositions containing herbal extracts such as dill, horseradish, oats, neem, beet, broccoli, tea, pumpkin, soybean, barley, walnut, flax, ginseng, poppy, avocado, pea or sesame for the delivery of active ingredients in the form of adhesive strips which remove keratotic plugs from skin pores (U.S. Patent No. 5,985,300); topical formulations containing

orange, avocado, watermelon, banana, lemon, palm oil, or coconut oil for the treatment of redness, swelling, itching, and soreness of the skin (U.S. Patent No. 5,932,230); skin cream compositions containing the juice of an avocado, cucumber, lemon, or weeping willow for cleansing, moisturizing, nourishing and healing the skin (U.S. Patent No. 4,722,843); a skin moisturizing and cleansing cream comprising a mixture of a predominant amount of fresh fruit (U.S. Patent No. 4,297,374); and skin moisturizing and sunscreen compositions containing biological extracts such as green tea extract, horsetail extract, sunflower extract, and wheat germ extract (U.S. Patent No. 5,788,954).

The healing properties of certain plant extracts have also been used in hair care compositions such as: hair cosmetic compositions containing a plant extract chosen from bark of birch, grass of rosemary, and avocado (U.S. Patent No. 4,839,168); compositions for treating dandruff (U.S. Patent No. 5,053,222) and hair growth-promoting compositions (JP62099319) containing mistletoe; and compositions containing a bean extract (JP59101414) that correct damaged hair.

While popular opinion regarding some of the touted uses of plant extracts ranges from skepticism to disbelief, there appears to be a firm scientific basis for many of the assertions. For example, many plant extracts contain lectins, also referred to as agglutinins, affinitins, phytoagglutinins, phasins or protectins. These are a group of proteins or glycoproteins, of both plant and animal origin, that have specific binding affinity to sugar groups which exist in polysaccharides or glycoproteins. Not to be limited as to theory, it is believed that this binding affinity to sugars is responsible for the observed therapeutic or protective properties that make plant extracts a choice material for use in target delivery of active ingredients or therapeutic agents.

U.S. Patent No. 4,217,341, for example, discloses compositions containing lectins which bind and agglutinate dental-plaque producing bacteria, thereby inhibiting the adherence of said bacteria to smooth surfaces such as teeth surfaces. Similarly, U.S. Patent No. 5,607,679 discloses a

method of treatment of a skin disease by binding lectins to a sialylated TF antigen of the skin. The specific affinity of lectins for sugars is also taught in U.S. Patent No. 5,510,120 and EP0481701 B1 where the lectin is covalently bound to a liposome which also contains an active ingredient. Thus the active is delivered to the specific site desired.

Plant extracts and lectins are also used in the characterization of carbohydrates because of their ability to bind to some sugar molecules and moieties, and their ability to cause cell agglutination by binding to the glycoproteins located in the cell membrane. The nature of the binding sites can be determined by the hapten-inhibition test. See Kornfeld, S. and Kornfeld, R., Lectins in the Study of Glycoproteins (1978). In this assay, various carbohydrates are tested for their ability to inhibit the lectin-induced agglutination of the test cells. It has been shown that various lectins react with a number of different carbohydrates, both simple and complex sugars. See Kornfeld, S. and Kornfeld, R., Glycoproteins of Blood Cells and Plasma (1971). In the majority of cases, the affinity of lectins to complex oligosaccharides is much greater than that to simple sugars. Among the lectins shown to have carbohydrate-binding sites of the complex type are the lectins from potato (*Solanum tuberosum*). Allen, A.K. and Neuberger, A., J. Biochem. 135, 307-314 (1973). Solanum tuberosum agglutinin (STA), which has an affinity for N-acetyl-β-D-glucosamine oligomers, is a glycoprotein containing approximately equivalent amounts of protein and carbohydrate.

In light of the useful properties of plant extracts discussed above, and in order to meet the public's demand for consumer products based on natural ingredients, there is a need for more cosmetic products that utilize the binding properties of plant extracts and are useful in restoring and protecting keratinous tissues.

To achieve these and other advantages, and in accordance with the purpose of the invention as embodied and broadly described herein, the present invention, in one aspect, provides a composition for the treatment or protection of keratinous tissue, the composition comprising at least one plant

extract and at least one sugar present in a combined amount synergistically effective to protect keratinous tissues from extrinsic damage. The at least one plant extract may be, but is not limited to, any plant extract that binds to sugar molecules or moieties. Representative sugars for use in the invention include sugars chosen from monosaccharides, disaccharides and polysaccharides.

In another embodiment, the present invention is drawn to a method of protecting keratinous tissue from extrinsic damage, *e.g.*, protein loss caused by exposure to heat, chemicals, etc., comprising applying to keratinous tissue a composition that contains at least one plant extract and at least one sugar present in a combined amount synergistically effective to protect the keratinous tissues from extrinsic damage. The present invention also contemplates a method of improving combability and/or a method of improving curl formation of keratinous fibers comprising applying to the keratinous fibers a composition comprising at least one plant extract and at least one sugar present in a combined amount synergistically effective to improve combability and/or improve curl formation of the keratinous fibers.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1: The evaluation of plant extracts for the protection of hair using the protein loss test on normal/bleached hair.

Figure 2: The evaluation of plant extracts for the protection of hair using the protein loss test on bleached hair.

Figure 3: Compositions containing mixtures of potato extract and a sugar are evaluated for their ability to protect hair by measuring the increase in wet

combing work. Compositions containing potato extract and a sugar in a combined amount synergistically effective to protect hair are shown.

Figure 4: Compositions containing mixtures of kidney bean extract and sucrose are evaluated for their ability to protect hair by measuring the increase in wet combing work. Compositions containing kidney bean extract and sucrose in a combined amount synergistically effective to protect hair are shown.

Figure 5: Compositions containing mixtures of willowherb extract and sucrose are evaluated for their ability to protect hair by measuring the increase in wet combing work. Compositions containing willowherb extract and sucrose in a combined amount synergistically effective to protect hair are shown.

Figure 6(a): Compositions containing mixtures of potato extract and trehalose are evaluated for their ability to protect hair from heat cycles, as measured by the increase in wet combing work. Compositions containing potato extract and trehalose in a combined amount synergistically effective to protect hair are shown.

(b): Compositions containing mixtures of potato extract and trehalose are evaluated for their ability to protect hair from losing its color due to heating. Compositions containing potato extract and trehalose in a combined amount synergistically effective to protect hair are shown.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the presently preferred embodiments of the present invention. The invention, in one aspect, provides a composition for the treatment or protection of keratinous tissue, the composition comprising at least one plant extract and at least one sugar. The at least one plant extract and the at least one sugar are present in a combined amount synergistically effective to protect keratinous tissues from extrinsic damage. Extrinsic damage is damage that is caused by conditions such as sun, chemical damage, *e.g.*, from detergents, bleaching, relaxing, dyeing, and permanent waving, and heat, e.g., from hair dryers or curlers. Examples of keratinous tissue include skin, hair, eyelashes, eyebrows and nails.

Plant extracts are known to bind to carbohydrate moieties, including the carbohydrate moieties of glycoproteins on the surface of cells. Therefore, it naturally follows that plant extracts should bind to keratinous tissue, which contains a number of sugars and carbohydrate moieties. It was unexpectedly discovered by the present inventors, however, that in addition to binding to keratinous tissue, plant extracts and plant extract like materials provide protection from extrinsic conditions to the keratinous tissue and also impart other desired benefits to keratinous tissue. Even more surprising was the ability of plant extracts to provide greater protection to keratinous tissue, especially hair, that has already been damaged by extrinsic conditions as compared to non-damaged hair.

For example, human hair contains a number of sugars or carbohydrate moieties, as summarized in Table 1 below. See Mathews, et al., Cosm. Technology 10 (1981). One such carbohydrate moiety is N-acetylneuraminic acid (NANA), which is found on the surface of the hair fiber. The presence of NANA in human hair can be observed by extracting the hair with acid under mild hydrolysis conditions. NANA is the most common member of the group of sialic acids, which are encountered in nature as terminal residues in the oligosaccharide moieties of glycoproteins. Thus, NANA indicates the presence of glycoproteins in hair.

TABLE 1: Monosaccharide content in normal hair

Monosaccharide	µmole/g hair
Glucosamine	1.01 ± 0.09
Galactosamine	0.26 ± 0.05
Galactose	0.46 ± 0.37
Glucose	5.73 ± 1.43
Mannose	1.02 ± 0.37
Xylose	0.56 ± 0.14
Fucose	0.14 ± 0.05
Hexuronic acid	8.53 ± 0.05
Sialic acids	0.37 ± 0.01

As the terminal residue, NANA is the first constituent exposed to the attack during various treatments applied to hair. Preliminary studies on the NANA distribution within the hair fiber, indicate that as much as 25% to 30%

of the total NANA content may reside close to the hair surface. Therefore, it is not surprising that the amount of NANA in hair decreases after water extraction, and is drastically reduced after acid extraction and after severe bleaching. In other words, the amount of NANA in keratinous fibers decreases as the fibers are damaged by extrinsic conditions such as water, chemical damage and heat. These treatments can be chemically non-aggressive (water; surfactants), as well as aggressive (permanent waving, often referred to as a "perm"; oxidative color/bleach; alkaline hair straightening). While detailed information on the function of NANA and glycoproteins in human hair is still lacking, it is known from other sources that the removal of one NANA residue from the oligosaccharide chain can change physical and biochemical properties of biomolecules. See Sharon, N., and Lis, H., The Proteins Vol. V, 1-145 (H. Neurath and R.L. Hill eds. Academic Press, NY) (1982).

Therefore, not to be limited as to theory, using plant extracts to protect terminal groups, such as NANA, during chemical attacks may result in the hair being protected during aggressive treatments. By the same token, plant extracts binding to NANA and the oligosaccharide chains of hair could protect normal and damaged hair against protein loss during non-aggressive treatments. Similarly, a carbohydrate moiety that is found in the skin and other keratinous tissue, *e.g.*, glycosaminoglucans (GAG's), may enable plant extracts to provide other keratinous tissue with the same protection as found for hair.

Thus, plant extracts have been shown to bind to keratinous tissue and impart protective effects to the tissue from damage by extrinsic conditions. Plant extracts also condition the surface of the tissue and retain the integrity of keratinous fibers by reducing cuticle loss. In addition to protecting keratinous tissue, plant extracts improve the combability and the curl formation of keratinous fibers.

The inventors have also surprisingly discovered that mixtures of a plant extract and a sugar result in a synergistic increase in the protection and conditioning of keratinous tissue, a reduction of cuticle and protein loss, and an improvement in the combability and curl formation of keratinous fibers.

For example, treatment of hair with plant extract/sugar compositions demonstrated a synergistic increase in the protection of hair as compared to composition containing a plant extract or sugar alone.

Therefore, the compositions of the present invention utilize at least one plant extract and at least one sugar that are present in a combined amount synergistically effective to protect keratinous tissue from extrinsic damage. Plant extracts and sugars useful in the compositions of the present invention are defined herein. Simple screening tests, *e.g.*, the combability test, are also provided herein for determining which plant extracts and sugars result in a synergistic combination and the amounts of plant extract and sugar necessary in each composition to obtain the synergistic amount envisaged. Compositions comprising mixtures of one or more plant extracts and one or more sugars are also within the practice of the invention.

Any plant extract that binds to carbohydrate moieties or sugars may be useful in the practice of the invention. A plant extract useful in the compositions of the invention may also be any plant extract that protects keratinous fibers from protein loss. The skilled artisan may determine by routine experimentation if a plant extract binds to carbohydrate moieties or protects keratinous fibers from protein loss depending on the application envisaged. Routine experiments for determining if a plant extract may be useful in the practice of the invention include column chromatography, as described in Example 1, which determines the binding of a plant extract to a carbohydrate moiety; the protein loss test, as described in Example 2, which determines whether a plant extract protects keratinous fibers from protein loss; and the combability test, as described in Example 3, which compares the increase in wet combing work caused by extrinsic conditions for hair treated with a plant extract versus untreated hair.

Preferred plant extracts of the present invention include, but are not limited to, willowherb extract; potato extracts such as Dermolectine® and Capilectine®; mistletoe extract; avocado extract; wheat germ extract; kidney bean extract; other vegetable extracts such as carrot, soybean, oat, beet, cucumber, broccoli, pumpkin and tomato extract; tobacco extract; other

herbal extracts such as dill, horseradish, weeping willow, ginseng, poppy, or sesame; other fruit extracts such as orange, lemon, watermelon, banana, and coconut. Plant extracts are generally supplied in water or glycerol solutions containing, for example, in the case of Dermolectine®, 60% glycerol, but it is possible that they may be obtained in more concentrated form. Additionally, many suppliers do not provide the percent active ingredient for commercially available plant extracts.

In a further preferred embodiment, the plant extracts of the present invention are chosen from plant extracts containing lectins. Lectins can be extracted from a variety of plant or animal materials and can be categorized by their affinity to a particular sugar or sugar complex. Lectins useful in the practice of the invention include, but are not limited to: *Solanum tuberosum L.* (potato extract), which may be purified by affinity chromatography and is commercially available from SEDERMA, Inc. (France) as Dermolectine® (700 mg/100 g actives concentration) and Capilectine® (500 mg/100 g actives concentration), ALBAN MULLER, Int. (France) and VEGETECH (CA); *Lycopersicon esculentum* (tomato extract); *Agaricus bisporus* (mushroom extract); *Arachis hypogea* (peanut extract); *Bauhinia pupurea* (camel's foot tree or seed extract); *Anguilla anguilla* (fresh water eel extract); *Tetragonolobus purpureas* (winged pea extract); *Ulex europaeus* (gorse or furze extract); *Lathyrus odoratus* (sweet pea extract); *Lens culinaris* (lentil extract) or *Pisum sativum* (pea extract); and agglutinins from *Glycine max* (soybean extract), *Helix aspersa* (garden snail extract) or *Helix pomatia* (roman or edible snail extract).

The sugars useful in the present invention may be any sugar, carbohydrate or carbohydrate moiety. In a preferred embodiment, the sugars may be chosen from monosaccharides, which include, but are not limited to, any three to seven carbon sugars such as pentoses, *e.g.*, ribose, arabinose, xylose, lyxose, ribulose, and xylulose, and hexoses, *e.g.*, allose, altrose, glucose, mannose, gulose, idose, galactose, talose, sorbose, psicose, fructose, and tagatose; disaccharides (which are saccharides that hydrolyze into two monosaccharides) such as maltose, sucrose, cellobiose, trehalose

and lactose; and polysaccharides (which are saccharides that hydrolyze into more than two monosaccharides) such as starch, dextrins, cellulose and glycogen. In a further preferred embodiment, the sugars of the invention are chosen from aldoses and ketoses.

The present invention also provides for a simple screening test, the combability test (See Garcia, M. L., and Diaz, J., J. Soc. Cosmet. Chem. 27, 370-398 (1976)), to determine which mixtures of plant extracts and sugars provide synergistically effective protection of keratinous tissue from extrinsic damage and what constitutes a synergistically effective amount of plant extract and sugar in such mixtures. The combability test is known in the art to correlate well to the amount of protection from exposure to extrinsic conditions that is afforded hair by a composition. Wet combing work of normal hair is determined prior to treatment. The hair is then divided into two groups and treated, one group with the plant extract and sugar mixture and the other group with control solutions containing the sugar alone or the plant extract alone. Following treatment, the hair is exposed to harsh extrinsic conditions such as heating. The increase in work or force required to comb wet hair is compared for the exposed hair treated with the mixture versus the exposed hair treated with the controls to determine if a synergistic effect is observed.

In a preferred embodiment, the synergistically effective mixture of at least one plant extract and at least one sugar is chosen from mixtures of potato extracts such as Dermolectine® and/or Capilectine® and one or more sugars chosen from sorbose, sucrose and trehalose; kidney bean extract and sucrose; and willowherb extract and sucrose.

In a preferred embodiment, a plant extract or mixture of plant extracts is present in the compositions of the present invention in an amount ranging from 0.01% to 5.0% relative to the total weight of the composition. In a further preferred embodiment a sugar or mixture of sugars is present in the compositions of the present invention in an amount ranging from 0.001% to 3.0% relative to the total weight of the composition. These ranges are based on a commercially available plant extract composition, which is approximately

60% glycerol. The preferred ranges of plant extract present in the compositions of the present invention may vary depending on the percent active ingredient of the plant extracts as supplied commercially.

The compositions of the present invention may be in the form of a liquid, oil, paste, stick, dispersion, emulsion, lotion, gel, or cream. The compositions of the present invention may also be provided as one-part compositions comprising the plant extract or mixture of plant extracts and the sugar or mixture or sugars or in the form of a multicomponent treatment or kit. The multicomponent kit may comprise one component that contains a plant extract and another component that contains a sugar. The combination of the components results in a composition containing at least one plant extract and the at least one sugar present in a combined amount synergistically effective to improve combability and/or improve curl formation of the keratinous fibers. The skilled artisan, based on the stability of the composition and the application envisaged, will be able to determine how the composition and/or multicomponent compositions should be stored and mixed.

In another embodiment, the present invention is drawn to a method of protecting keratinous tissue from extrinsic damage comprising applying to keratinous tissue a composition that contains at least one plant extract and at least one sugar. The at least one plant extract and the at least one sugar are present in a combined amount synergistically effective to protect the keratinous tissues from extrinsic damage.

The present invention also contemplates a method of improving combability and/or a method of improving curl formation of keratinous fibers comprising applying to the keratinous fibers a composition comprising at least one plant extract and at least one sugar. The at least one plant extract and the at least one sugar are present in a combined amount synergistically effective to improve combability and/or improve curl formation of the keratinous fibers. Keratinous fibers (as opposed to keratinous tissue) are defined as hair, eyebrows, and eyelashes.

The invention will be illustrated by, but is not intended to be limited to, the following examples. Examples 1 through 6 provide screening tests that

one of skill in the art may use to choose plant extracts for use in the compositions of the invention. However, a positive result in any or all of the tests provided is not required for use of a plant extract in the compositions and methods of the invention. The first six examples also provide the skilled artisan with procedures that may be used to evaluate a synergistic mixture of at least one plant extract and at least one sugar. Example 7 demonstrates the synergistically effective protection from extrinsic conditions afforded hair by a composition of the invention.

Example 1. A Test to Determine the Binding of a Plant Extract to a Carbohydrate Moiety

A screening test to determine the applicability of a plant extract for use in the compositions of the present invention was carried out. Since any plant extract that binds to carbohydrate moieties or sugars may be useful in the practice of the invention, the skilled artisan may use column chromatography or HPLC to quickly determine the binding properties of a plant extract to a specific carbohydrate and therefore the possible utility of that plant extract for the application envisaged.

HPLC experiments were performed as shown in Table 4 below. A cation exchange chromatographic column that will not retain NANA but will retain or slow the elution of a NANA/plant extract complex was chosen, in this case a NANA/Dermolectine® complex. The amount of NANA recovered following HPLC with the control solution (glycerol was chosen as a control because the Dermolectine® solution contained 60% glycerol), as calculated from NANA's absorption at 200 nm, was then compared to the amount of NANA recovered following HPLC with a solution containing the potato extract, Dermolectine®.

NANA in the glycerol control solution was not retained by the column during HPLC and 100% of the NANA was recovered at a time A. Therefore, any NANA from the NANA/Dermolectine® solutions passed through the column that was not recovered at time A was due to an interaction between NANA and the Dermolectine®. As shown in Table 4, the lower amounts of

NANA recovered following HPLC demonstrated that Dermolectine® is capable of binding NANA.

TABLE 4. Effect of Dermolectine® on NANA Determination by HPLC (200 nm Detection)

Solution	% NANA Recovered
NANA in 60% Glycerol*/0.1N H_2SO_4	100
NANA in 60% Glycerol*/0.1N H_2SO_4, 1h at 80°C	100
NANA in 100% Dermolectine®/0.1N H_2SO_4	80
NANA in 100% Dermolectine®/0.1N H_2SO_4, 1 h at 80°C	66

* Dermolectine® contains 60% glycerol.

Example 2. A Test to Determine the Protection of Keratinous Fibers from Protein Loss by a Plant Extract

Another screening test to determine the applicability of a plant extract for use in the compositions of the present invention was carried out. A plant extract useful in the compositions of the invention may also be any plant extract that protects keratinous fibers from protein loss. The skilled artisan, may determine by the protein loss test, whether a plant extract protects keratinous fibers from protein loss.

The effect of the potato extracts, Dermolectine® and Capilectine®, respectively, on the protein loss from keratinous fibers in water was tested against the control, glycerol. Each of the solutions of Table 5 below, was applied to a swatch of bleached hair for 5 minutes at room temperature (ratio of hair:liquid = 1:10, w/w). The hair swatches were then rinsed with tepid water for one minute, air-dried, and then each swatch was placed in a separate 50 ml Erlenmeyer flask and deionized water was added at a ratio of hair:water = 1:15, w/w. The hair samples were shaken in a Gyrotory Water Bath Shaker Model G76 (New Brunswick Scientific Co.) for 1 hour at room temperature.

The protein content in each water sample was determined by the Lowry technique. See Sandhu, S.S., and Robbins, C.R., J. Soc. Cosmet.

Chem., 44, 163-175 (1993). As shown in Table 5, the protein loss from the hair pre-treated with 1% solutions of Dermolectine® and Capilectine® was significantly lower than that from the hair pre-treated with the glycerol solution.

TABLE 5. Protein Loss in Water from Bleached Hair. Effect of One Pre-treatment

Treatment Solution	Protein loss, mg/g hair
No treatment	3.05 ± 0.02
0.6% Glycerol - Control	2.56 ± 0.06
1% Capilectine®	1.76 ± 0.04
1% Dermolectine®	2.09 ± 0.06

In another experiment, 1% solutions of different potato extracts were tested for their capacity to protect bleached hair from protein loss. The effect of the glycerol-containing extracts Dermolectine®, Capilectine®, and Potato HS, was compared to that of 0.6% glycerol, while the glycerol-free raw materials, Potato Peel Extract and Potato Extract, (VEGETECH), were tested against water. See Table 6 below.

Swatches of bleached hair were treated with the above solutions for 5 minutes at room temperature, and rinsed with tepid water for one minute. The treatments were repeated five times. The shaking-in-water procedure was conducted as described above. In all cases, the protein loss from the bleached hair treated with the potato extracts was significantly lower than that from the corresponding control swatches (See Table 6).

TABLE 6. Protein Loss in Water from Bleached Hair. Effect of Five Pre-Treatments

Treatment Solution	Protein loss, mg/g hair
I. Glycerol Containing Solutions	
1.0% Glycerol - Control	0.75 ± 0.09
1% Capilectine®	0.55 ± 0.09
1% Dermolectine®	0.61 ± 0.05
1% Potato HS	0.44 ± 0.05
II. Glycerol-Free Solutions	
Water treatment - Control	0.97 ± 0.11
1% Potato Peel Extract	0.61 ± 0.08
1% Potato Extract	0.76 ± 0.05

Example 3. Protection of Normal Hair By Plant Extracts During Bleaching

The combability test was used to determine the amount of protection from extrinsic conditions afforded hair by a composition of the invention. The wet combing force of normal brown hair was determined prior to further treatment. See Garcia, M. L., and Diaz, J., J. Soc. Cosmet. Chem. 27, 370-398 (1976). Next, solutions of the potato extracts, Dermolectine® and Potato HS respectively, each at concentrations of 0.5%, 1.0%, and 3% by weight, were applied to the hair for 5 minutes at room temperature (hair:solution=1:10, w/w). Dermolectine® and Potato HS each contain 60-80% glycerol, therefore these potato extracts were tested against 3% glycerol solutions (control). The treatment was repeated three times, with the hair being rinsed and air-dried between each application. The pre-treated normal hair was then equilibrated under room conditions for 24 hours and bleached (30 minutes at room temperature; 12% H_2O_2, pH 9.7 adjusted with ammonia). The bleached hair was tested for the increase in wet combing force as compared to the initial wet combing force for normal brown hair before treatment and bleaching. All tests were performed in duplicate.

As shown below in table 7, the increase in the wet combing force for hair pre-treated with Dermolectine® or Potato HS solutions was significantly lower than that observed for hair pre-treated with the glycerol solution.

Table 7. Wet Combing of Bleached Hair: Effect of Pre-Bleach Treatment. (Tests performed in duplicate; 10 comb strokes per test)

Treatment	Increase in wet combing energy, %
3% Glycerol	178.9 ± 12.6
0.5% Potato HS	109.7 ± 2.1
1.0% Potato HS	109.8 ± 3.7
3.0% Potato HS	73.8 ± 11.3
0.5% Dermolectine®	106.6 ± 13.41
1.0% Dermolectine®	113.7 ± 6.21
3.0% Dermolectine®	104.1 ± 9.96

Example 4. Improved Combing of Bleached Hair Treated with Plant Extracts

The combability or wet combing force for bleached hair was determined before and after treatment with potato extract. Bleached hair was treated with a solution of 1% of the potato extract, Capilectine®, while another sample of bleached hair was treated with a solution of 0.6% glycerol. All sample were treated for 5 minutes at room temperature at a hair:liquid ratio of 1:10 (w/w) and then rinsed for 3 minutes with tepid water. The wet combing force after the Capilectine® application was lessened, indicating that the application improved the combability by 45%, while there were no significant changes after the glycerol treatment (Table 8).

Table 8. Improvement in Wet Combing of Bleached Hair (Tests performed in duplicate; 10 comb strokes per test)

Treatment	Percent Improvement in wet combing energy, %
0.6% Glycerol	no change
1.0% Capilectine	45.2

Example 5. Improved Curl Formation in the Permanent Waving of Normal and Tinted Hair Treated with Plant Extract

The curl formation in the permanent waving of 12 fiber swatches of normal brown hair and normal brown hair tinted with ColorGel® 6RO (Redken) using 20 volume of H_2O_2 was measured. The swatches (l_0 (average initial length) = 12.5 cm) were wound on perm rods (7.5 mm diameter), 6 rods per test (n = 6). Each of three groups of swatches was saturated with one of the following pre-treatments: a) water; b) 0.6% glycerol; c) 1% Dermolectine®, respectively, at a ratio of 2 ml per rod; and maintained for 5 min at room temperature. Next, the rods were blotted with paper-towel, and the permanent waving reforming lotion was applied (10% Thioglycolic acid (TGA), 1% Betaine, pH 9.01, NH_4OH; 2 ml per rod). The hair was processed for 30 minutes at room temperature; rinsed in deionized water (100 mL/6 rods; 5 minutes); neutralized with 2% H_2O_2, pH 3 (5 minutes; 2 ml/rod); and again rinsed with deionized water (100 mL/6 rods; 5 minutes). The rods were blotted with a paper towel, the hair was taken off the rods, and the diameter and the length of the wet curl were measured. The length of the dry curl of the swatches was measured after drying in a vertical position on the board.

As shown in Table 9 below, the wet and the dry curl length of the hair pre-treated with 1% Dermolectine® was significantly lower, as compared to the hair pre-treated with water. There was no significant difference in the curl formation between the water- and the glycerol-treated hair.

Table 9. Improvement in Perm Efficiency: Effect of Pre-Treatment

Hair type/ Treatment	Avg. Wet curl length, cm l_o = 12.5 cm n = 6	Avg. Dry curl length, cm l_o = 12.5 cm n = 6
Normal Brown Hair:		
Water	5.20 ± 0.19	6.60 ± 0.18
0.6% Glycerol	5.32 ± 0.40	6.83 ± 0.42
1% Dermolectine®	4.80 ± 0.32	6.02 ± 0.19
Brown Hair Tinted with ColorGel® 6RO:		
Water	6.03 ± 0.32	6.95 ± 0.35
0.6% Glycerol	6.05 ± 0.33	7.08 ± 0.27
1% Dermolectine®	5.08 ± 0.25	6.28 ± 0.31

Example 6. Protection of Normal Hair with Plant Extracts

Swatches of normal brown hair were treated with one of the following 1% solutions of: Dermolectine®, avocado extract (Active Organics), Mistletoe Extract (Active Organics), and Wheat Germ Extract (Active Organics). Since all of the plant extracts contained 60 to 80 % glycerol, control swatches of hair were treated with water and 1% glycerol, respectively. The hair was then bleached with 12% H_2O_2, pH 8.8 (NH_4OH) for 20 minutes at room temperature. There was no significant difference in the lift of color between the extract treated and water treated swatches.

The hair was digested in 6N HCL (110°C, 24 hours) and analyzed for cysteic acid using a Beckman System 6300 High Performance Analyzer. The cysteic acid content is another way to measure the amount of damage to hair fibers caused by bleaching. The higher the cysteic acid content, the more damage done to the hair. As shown in Table 10 below, while all of the plant extracts tested protected hair from loss of NANA relative to water and

glycerol, there was no appreciable difference in the cysteic acid content of hair pretreated by plant extract.

The hair was also analyzed for protein loss in water as described above. Table 10, below, and Figure 1, attached, show that mistletoe extract and Dermolectine® provided protection against protein loss at these low concentrations. While no appreciable protection against protein loss was observed for wheat germ extract or Avocado extract at these concentrations, protection against protein loss may be observable at higher concentrations of plant extract.

Finally, the hair was analyzed for NANA content. NANA content was measured by the following procedure. The hair was digested with papain/dithiotreitol, lyophilized, and reconstituted with 0.2 N H_2SO_4. The hair was then hydrolyzed at 80°C for 1 hour, derivatized with the fluorescent probe, 1,2-diamino-4,5-methlenedioxybenzene, and analyzed for NANA content by reverse-phase HPLC. As shown in Table 10, all of the plant extracts protected the hair from loss of NANA during bleaching, which indicates protection of hair surface glycoproteins.

TABLE 10. Protection of Hair with Plant Extracts

Hair/Treatment	NANA, nmole/g hair	Cysteic acid, Mole %	Protein loss, µg/g hair
Normal Hair	619 ± 13	0.5 ± 0.1	306 ± 3
Bleached hair, pretreated with:			
	409 ± 71	1.8 ± 0.2	410 ± 60
Water	485	1.9 ± 0.2	481 ± 13
1.0% Glycerol - Control	500 ± 5	1.8 ± 0.1	471 ± 76
1% Wheat Germ	506 ± 43	2.2 ± 0.1	390 ± 18
1% Mistletoe	560 ± 55	1.8 ± 0.1	380 ± 14
1% Dermolectine®	585 ± 28	1.9 ± 0.1	476 ± 45
1% Avocado			

A similar experiment was performed using hair that was bleached one time (1X). Swatches of bleached hair were treated by one of the following procedures:

a) 0.5 % potato extract (VEGETECH) solution was applied for 5 minutes at room temperature, rinsed under tap water, air-dried, and equilibrated for 24 hours at room conditions before bleaching;

b) 2.0 % potato extract (VEGETECH) solution was applied following the procedure set forth in (a);

c) 0.5 % potato extract (VEGETECH) solution was applied for 5 minutes at room temperature, blot-dried with a paper towel, air-dried, and equilibrated for 24 hours at room conditions before bleaching; and

d) 1.0 % potato extract (VEGETECH) solution was applied following procedure (c). The potato extracts did not contain glycols, therefore, water was used as a control treatment.

The bleached hair was then bleached again with 12% H_2O_2, pH 8.8 (NH_4OH) for 20 minutes at room temperature. There was no significant difference in the lift of color between the extract-treated and water-treated swatches. The hair was analyzed for cysteic acid and protein loss in water as described above.

As shown in Table 11, each of the plant extract solutions protected the hair from cysteic acid formation. In addition, as shown in Table 11 and Figure 2, each of the plant extract solutions protected the hair from protein loss. A concentration dependence was also observed with regard to the ability of a plant extract to protect hair from protein loss.

TABLE 11. Protection of Bleached Hair with Plant Extracts

Hair/Treatment	Cysteic acid, Mole %	Protein loss, µg/g hair
Bleached Hair, 1X	2.9 ± 0.1	360 ± 2
Bleached Hair after Second Bleaching (2X), pretreated with Potato Extract:		
Water (control)	4.4 ± 0.1	1023 ± 70
0.5% Extract, rinsed	3.8 ± 0.1	1000 ± 21
2.0% Extract, rinsed	3.9 ± 0.1	914 ± 23
0.5% Extract, left-in	3.7 ± 0.1	916 ± 15
1.0% Extract, left-in	3.6 ± 0.1	878 ± 5

Example 7. Synergistic Effect of Protecting Hair Using a Plant Extract/Sugar Mixture

The combability test was used to demonstrate the synergistically effective protection from extrinsic conditions, such as heat, afforded hair by a composition of the invention. The wet combing force of bleached hair was determined prior to further treatment. Next, hair swatches were treated with one of the following solutions:

a) water (control);

b) glycerol (control);

c) plant extract solution;

d) sugar solution; and

e) plant extract and sugar mixture.

The various plant extracts, sugars, mixtures of plant extracts and sugars and the concentrations of each in solution are shown in Figures 3, 4, 5, and 6(a).

The solutions were applied to the hair for 5 minutes at room temperature (hair:solution ratio = 1:10, w/w). The treatment was repeated six times, with the hair being rinsed and subjected to heating cycles between each treatment. See McMullen, R. and Jachowicz, J., J. Cosmet. Sci., 49, 223-244 (1998). The bleached hair was tested for the increase in wet combing force as compared to the initial wet combing force of the bleached

hair before treatment and heating to determine the efficacy of the treatments against heat exposure.

Figure 3 shows a reduction in percent increase in wet combing work. This indicates that there was a synergistically effective protection of hair from heat cycles using a potato extract/sorbose or potato extract/sucrose mixture at the concentrations shown. A synergistically effective result was not observed for a potato extract/maltodextrin composition at the concentrations shown. This does not mean, however, that a potato extract/maltodextrin composition will not have a synergistic effect at higher concentrations. A synergistically effective protection of hair for heat cycles was also observed from hair treated with compositions containing kidney bean extract/sucrose mixtures (Figure 4), willowherb extract/sucrose mixtures (Figure 5), and potato extract/trehalose mixtures (Figure 6).

L values of the hair were also measured (Micro Flash, Datacolor International) before and after the treatment/heat exposure cycle to determine the efficacy of the treatments against loss of natural color due to heat exposure (Figure 6b). In the art of hair dyeing, and as defined in the L, a, b colorimetric notations system of the Commission Internationale de l'Eclairage, L defines the intensity of the shade. See U.S. Patent No. 6,010,541, Col 1, line 66 to Col. 2, line 8, and Col. 9, lines 15- 57. The shade is proportionally more intense the lower the value of L.

In this example, the natural color of the hair was white. The more the hair is damaged due to heat exposure, the more the natural color of the hair changes to yellow and the greater the change in L. In other words, the smaller the change in L following exposure to heat, the less damage to the hair, thus, more protection provided by the composition being tested. Figure 6(b) shows that bleached hair treated with a potato extract/trehalose mixture demonstrated a synergistically effective protection of hair from loss of natural color due to heat.

It will be apparent to those skilled in the art that various modifications and variations can be made in the compositions and methods of the present

invention without departing from the spirit or scope of the invention. Thus, it is intended that the present description cover the modifications and variations of this invention provided that they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A composition for the treatment or protection of keratinous tissue, said composition comprising at least one plant extract and at least one sugar present in a combined amount synergistically effective to protect said keratinous tissue from extrinsic damage.

2. A composition according to claim 1, wherein said at least one plant extract is chosen from potato extract, mistletoe extract, avocado extract, wheat germ extract, willowherb extract and kidney bean extract.

3. A composition according to claim 1, wherein said sugar is chosen from monosaccharides, disaccharides and polysaccharides.

4. A composition according to claim 3, wherein said monosaccharides are chosen from pentoses and hexoses.

5. A composition according to claim 4, wherein said pentoses are chosen from ribose, arabinose, xylose, lyxose, ribulose, and xylulose.

6. A composition according to claim 4, wherein said hexoses are chosen from allose, altrose, glucose, mannose, gulose, idose, galactose, talose, sorbose, psicose, fructose, and tagatose.

7. A composition according to claim 3, wherein said disaccharides are chosen from maltose, sucrose, cellobiose, trehalose and lactose.

8. A composition according to claim 3, wherein said polysaccharides are chosen from starches, dextrins, celluloses and glycogens.

9. A composition according to claim 1, wherein said sugar is sucrose and said plant extract is willowherb extract.

10. A composition according to claim 1, wherein said composition is in the form of a liquid, oil, paste, stick, dispersion, emulsion, lotion, gel, or cream.

11. A composition according to claim 1, wherein said keratinous tissue is chosen from skin, hair, eyelashes, eyebrows, and nails.

12. A composition according to claim 1, wherein said at least one plant extract is present in said composition at a concentration ranging from 0.01% to 5.0% relative to the total weight of the composition.

13. A composition according to claim 1, wherein said at least one sugar is present in said composition at a concentration ranging from 0.001% to 3.0% relative to the total weight of the composition.

14. A method of protecting keratinous tissue from extrinsic damage comprising

applying to said keratinous tissue a composition comprising

at least one plant extract and at least one sugar present in a combined amount synergistically effective to protect said keratinous tissues from extrinsic damage.

15. A method of protecting keratinous tissue from extrinsic damage according to claim 14, wherein said at least one plant extract is chosen from potato extract, mistletoe extract, avocado extract, wheat germ extract, willowherb extract and kidney bean extract.

16. A method of protecting keratinous tissue from extrinsic damage according to claim 14, wherein said sugar is chosen from monosaccharides, disaccharides and polysaccharides.

17. A method of protecting keratinous tissue from extrinsic damage according to claim 16, wherein said monosaccharides are chosen from pentoses and hexoses.

18. A method of protecting keratinous tissue from extrinsic damage according to claim 17, wherein said pentoses are chosen from ribose, arabinose, xylose, lyxose, ribulose, and xylulose.

19. A method of protecting keratinous tissue from extrinsic damage according to claim 17, wherein said hexoses are chosen from allose, altrose, glucose, mannose, gulose, idose, galactose, talose, sorbose, psicose, fructose, and tagatose.

20. A method of protecting keratinous tissue from extrinsic damage according to claim 16, wherein said disaccharides are chosen from maltose, sucrose, cellobiose, trehalose and lactose.

21. A method of protecting keratinous tissue from extrinsic damage according to claim 16, wherein said polysaccharides are chosen from starches, dextrins, celluloses and glycogens.

22. A method of protecting keratinous tissue from extrinsic damage according to claim 14, wherein said sugar is sucrose and said plant extract is willowherb extract.

23. A method of protecting keratinous tissue from extrinsic damage according to claim 14, wherein said composition is in the form of a liquid, oil, paste, stick, dispersion, emulsion, lotion, gel, or cream.

24. A method of protecting keratinous tissue from extrinsic damage according to claim 14, wherein said keratinous tissue is chosen from skin, hair, eyelashes, eyebrows, and nails.

25. A method of improving combability and/or curl formation of keratinous fibers comprising

applying to said keratinous fibers a composition comprising

at least one plant extract and at least one sugar present in a combined amount synergistically effective to improve combability and/or curl formation.

26. A method of improving combability and/or curl formation according to claim 25, wherein said at least one plant extract is chosen from potato extract, mistletoe extract, avocado extract, wheat germ extract, willowherb extract and kidney bean extract.

27. A method of improving combability and/or curl formation according to claim 25, wherein said sugar is chosen from monosaccharides, disaccharides and polysaccharides.

28. A method of improving combability and/or curl formation according to claim 27, wherein said monosaccharides are chosen from pentoses and hexoses.

29. A method of improving combability and/or curl formation according to claim 28, wherein said pentoses are chosen from ribose, arabinose, xylose, lyxose, ribulose, and xylulose.

30. A method of improving combability and/or curl formation according to claim 28, wherein said hexoses are chosen from allose, altrose, glucose, mannose, gulose, idose, galactose, talose, sorbose, psicose, fructose, and tagatose.

31. A method of improving combability and/or curl formation according to claim 27, wherein said disaccharides are chosen from maltose, sucrose, cellobiose, trehalose and lactose.

32. A method of improving combability and/or curl formation according to claim 27, wherein said polysaccharides are chosen from starches, dextrins, celluloses and glycogens.

33. A method of improving combability and/or curl formation according to claim 25, wherein said sugar is sucrose and said plant extract is willowherb extract.

34. A method of improving combability and/or curl formation according to claim 25, wherein said composition is in the form of a liquid, oil, paste, stick, dispersion, emulsion, lotion, gel, or cream.

35. A method of improving combability and/or curl formation of keratinous fibers according to claim 25, wherein said keratinous fibers are chosen from hair, eyelashes, and eyebrows.

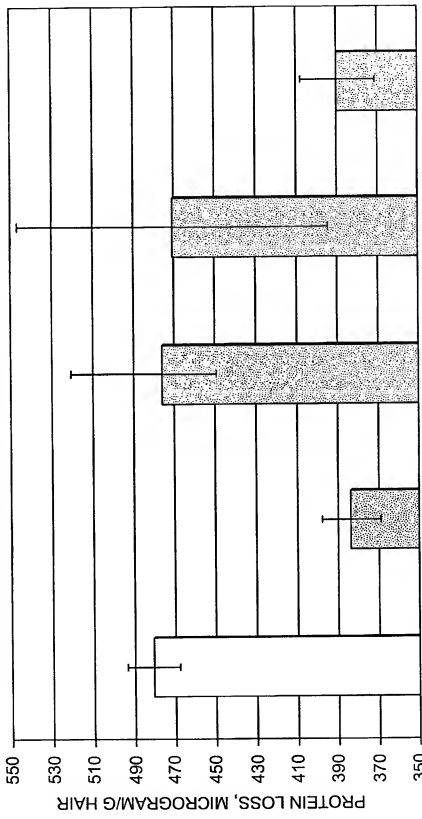
PROTEIN LOSS FROM NORMAL/BLEACHED HAIR: EFFECT OF PRE-TREATMENT
PROTEIN LOSS, MICROGRAM/G HAIR
550
530
510
490
470
450
430
410
390
370
350
GLYCEROL/BLEACH
1% DERMOLECTIN
1%AVOCADO
1% WHEAT GERM
1%MISTLETOE
PRE-TREATMENT

FIG. 1

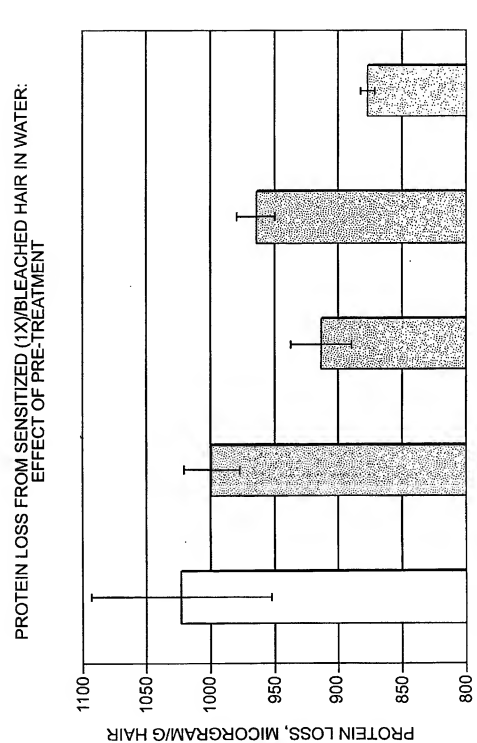
PROTEIN LOSS FROM SENSITIZED (1X)/BLEACHED HAIR IN WATER:
EFFECT OF PRE-TREATMENT
PROTEIN LOSS, MICORGRAM/G HAIR
1100
1050
1000
950
900
850
800
WATER
0.5%/RINSE
2.0%/RINSE
0.5%LEAVE-IN
1.0%LEAVE-IN
PRE-TREATMENT

FIG. 2

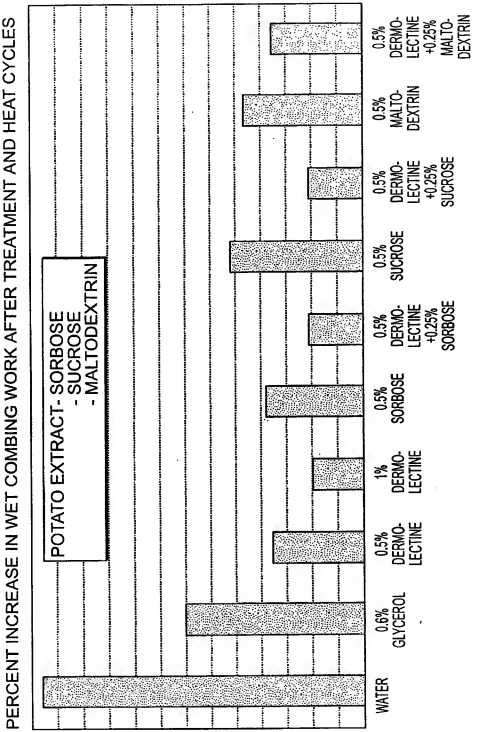
PERCENT INCREASE IN WET COMBING WORK AFTER TREATMENT AND HEAT CYCLES
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
POTATO EXTRACT - SORBOSE
- SUCROSE
- MALTODEXTRIN
WATER
0.6% GLYCEROL
0.5% DERMO-LECTINE
1% DERMO-LECTINE
0.5% SORBOSE
0.5% DERMO-LECTINE +0.25% SORBOSE
0.5% SUCROSE
0.5% DERMO-LECTINE +0.25% SUCROSE
0.5% MALTO-DEXTRIN
0.5% DERMO-LECTINE +0.25% MALTO-DEXTRIN

FIG. 3

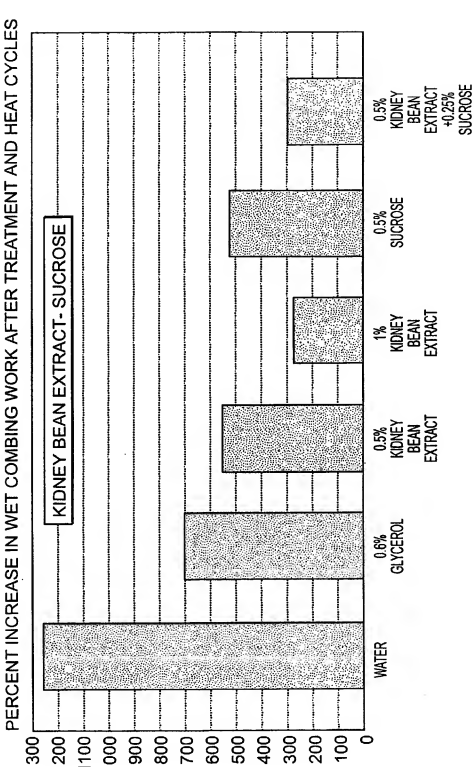
PERCENT INCREASE IN WET COMBING WORK AFTER TREATMENT AND HEAT CYCLES
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
KIDNEY BEAN EXTRACT- SUCROSE
WATER
0.6% GLYCEROL
0.5% KIDNEY BEAN EXTRACT
1% KIDNEY BEAN EXTRACT
0.5% SUCROSE
0.5% KIDNEY BEAN EXTRACT +0.25% SUCROSE

FIG. 4

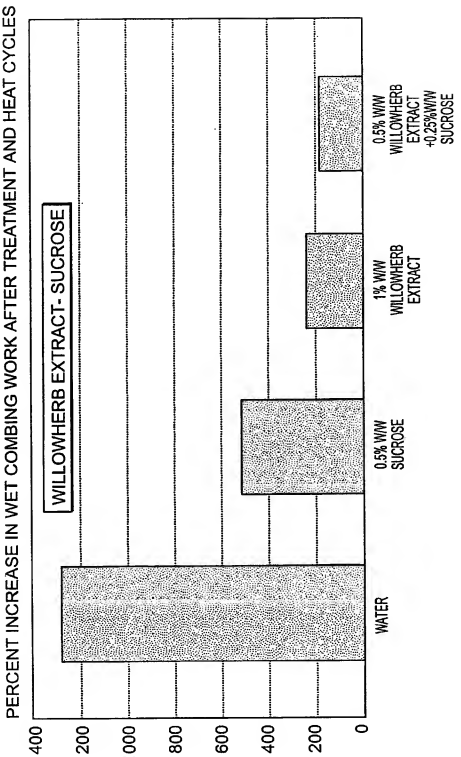
PERCENT INCREASE IN WET COMBING WORK AFTER TREATMENT AND HEAT CYCLES
WILLOWHERB EXTRACT- SUCROSE
1400
1200
1000
800
600
400
200
0
WATER
0.5% W/W SUCROSE
1% W/W WILLOWHERB EXTRACT
0.5% W/W WILLOWHERB EXTRACT +0.25%W/W SUCROSE

FIG. 5

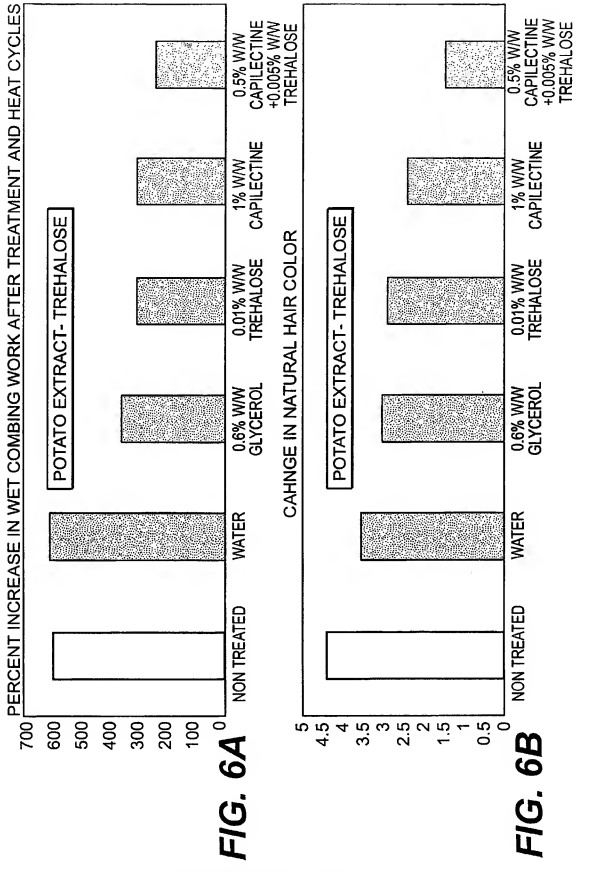
PERCENT INCREASE IN WET COMBING WORK AFTER TREATMENT AND HEAT CYCLES
700
600
500
400
300
200
100
0
POTATO EXTRACT- TREHALOSE
NON TREATED
WATER
0.6% W/W GLYCEROL
0.01% W/W TREHALOSE
1% W/W CAPILECTINE
0.5% W/W CAPILECTINE +0.005% W/W TREHALOSE
CAHNGE IN NATURAL HAIR COLOR
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
POTATO EXTRACT- TREHALOSE
NON TREATED
WATER
0.6% W/W GLYCEROL
0.01% W/W TREHALOSE
1% W/W CAPILECTINE
0.5% W/W CAPILECTINE +0.005% W/W TREHALOSE

FIG. 6A

FIG. 6B